VOLUME I
REMEDIAL INVESTIGATION/ FEASIBILITY STUDY WORKPLAN
WALKER PROPERTY SITE
SANTA FE SPRINGS, CALIFORNIA

Prepared for

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1.0 INTRODUCTION

This workplan presents the managerial and technical approach and scope of work for the Remedial Investigation and Feasibility Study (RI/FS) to be conducted at the Walker Property Site (Site) in Santa Fe Springs, California (Plate 1). This workplan has been developed to comply with California Department of Toxic Substances Control (DTSC) guidelines and the U.S. Environmental Protection Agency (EPA) "Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA" (EPA, 1988). The DTSC will provide oversight during the RI/FS, as described in the First Amended Imminent and Substantial Endangerment Order and Remedial Action Order (the Order) (Docket No. I&/SE 91/92-009, issued by the DTSC and effective October 26, 1992.

Other interested governmental agencies are expected to include the California Regional Water Quality Control Board - Los Angeles Region (RWQCB), the Los Angeles County Department of Public Works (LADPW), and the City of Santa Fe Springs.

The Order identifies two portions of the Site for remedial investigation: the Lakewood Oil Services (Lakewood) Section and the Railroad Section, as shown on Plate 2. The Order indicates that the Lakewood Section is an area impacted by polychlorinated biphenyls (PCBs), metals, and hydrocarbons; there are also a small number of drums placed in this area. The Railroad Section brackets the area around a railroad spur and is primarily impacted by aboveground asbestos-containing insulation in a limited area. According to the Order, remediation or abatement of soil impacted by spills or leaks from fuel storage tanks in the former Powerine Oil Company (Powerine) area in the southwest corner of the Site is under the jurisdiction of the RWQCB.

1.1 OBJECTIVE

The RI/FS has been designed to achieve five main objectives within the Lakewood and Railroad sections of the Site, as defined by the Order. The objectives are:

- Determine the nature and extent of hazardous substance contamination of air, soil, surface water, and groundwater at the Site and contamination from the Site, including offsite areas affected by the Site;

- Identify existing and potential contaminant migration pathways including the direction, rate, and dispersion of contaminant migration;

- Determine the magnitude and probability of actual or potential harm to public health, safety, or welfare, and the environment posed by the treatment or actual release of hazardous substances at or from the Site;

- Identify and evaluate appropriate response measures to prevent or minimize future releases and mitigate any releases that have already occurred; and

- Collect and evaluate the information necessary to prepare a Remedial Action Plan in accordance with the requirements of Health and Safety Code Section 25356.1.

1.2 APPROACH

A general sequence of RI/FS activities and their relationship to the process of Site remediation is presented on Plate 3. The RI is expected to be followed by the majority of the FS activities. However, some overlap of RI and FS activities will occur so that the appropriate site data are collected to support proper evaluation of remedial alternatives.

2.0 SITE BACKGROUND AND SETTING

2.1 GENERAL FEATURES

The Site is located at the southeastern corner of the intersection of Bloomfield Avenue and Lakeland Road in the City of Santa Fe Springs, California (Plate 1). The assessor's parcel number is 8026-001-042. The fenced site occupies approximately 21.32 acres and is bounded by Lakeland Road on the north; an Atchinson, Topeka, and Santa Fe Railroad right-of-way on the east; Bloomfield Avenue on the west; and the Kelly Pipe Company property on the south. The area is industrialized to the north, east, and south. Metropolitan State Hospital is directly across Bloomfield Avenue to the west, within the City of Norwalk. A portion of the Powerine refinery is located to the northwest across Lakeland Road. The nearest schools and residential areas are one-quarter of a mile to the east.

The Site is now nearly vacant. Little remains of previous site facilities that operated on many different areas of the property (Plate 2). Balboa/Pacific Corporation (Balboa), which designs and constructs industrial wastewater treatment systems, is the only current (since 1986) tenant of the Site. The Balboa operations include a materials storage/fabrication yard.

Three aboveground storage tanks (AGSTs) remaining from Lakewood's waste-oil storage and filtration operations are located in the northwest corner of the property. Some miscellaneous piping and an earthen-berm/concrete-wall retention dike remain in the southwest corner of the Site, where Powerine stored gas oil and jet fuel in two former AGSTs. An abandoned railroad spur lies along the eastern portion of the property. Although the spur is still in place, it does not connect to the mainline tracks east of the Site.

The Site lies at approximately 145 feet (northeastern corner) to 130 feet (southwestern corner) above Mean Sea Level (MSL). This results in a surface slope trending southwest at 1 percent. Prior to 1967, a natural drainage with intermittent surface-water flow was located on the eastern portion of the Site (Plate 4). In 1967, this drainage was replaced by a 42-inch-diameter stormdrain pipe, and site grades were raised by filling as discussed below (Plates 5 and 6) (Sladden Engineering, 1967). A catch basin, in the southeast corner of the

Site, was constructed and apparently serves to drain much of the eastern portion of the Site (Plate 5).

2.2 SITE HISTORY

The Site, currently owned by Mr. and Mrs. George Walker (Walker), has been owned and/or operated by a number of different companies since it was sold in 1934 to Getty Oil Company (Getty). The property has been used for, among other things, storage of crude oil, refined product, waste-oil, and storage/disposal of oil-well drilling fluids (Tables 1 and 2).

Public files reviewed by HLA during preparation of this workplan, or previously reviewed by TRC Environmental Consultants (TRC) and reported in a Preliminary Endangerment Assessment (PEA) (TRC, 1990j), included:

- DTSC - An extensive file exists on the Site. All previous reports generated in final form are within the file, along with several draft reports. HLA reviewed the file for all new technical data added since July 1990;
- RWQCB - No file exists on the Site other than TRC reports given to the RWQCB by TRC. No information regarding the Powerine area of the Site was found by HLA within the RWQCB's Powerine Oil Company file;
- City of Santa Fe Springs - Planning Department, Public Works Department, Fire Department - permits for conditional use, USTs, business applications, land use maps, and utility service maps were reviewed by TRC (TRC, 1990j).
- South Coast Air Quality Management District (SCAQMD) - TRC (1990j) found permits pertaining to the 1990 AGST and underground storage tank (UST) removals.
- Los Angeles County Flood Control District - TRC (1990j) reviewed a file referencing the 1967 storm drain installation across the Site and the subsequent regrading of the Site, as well as flood plain maps.
- California Department of Conservation - Division of Oil and Gas - No files exist for the Site (TRC, 1990j); therefore, oil/gas wells have not been located on the Site.
- LADPW - TRC (1990j) reviewed a file regarding the removal of a 12,000-gallon UST witnessed by Dames and Moore in 1986 and obtained a map showing the location of the storm drains in the site vicinity.

- Regulatory Databases (ASPIS, CERCLIS) - These databases were reviewed and contain summary information regarding potential environmental problems at the Site (TRC, 1990j).

The following historical information has been summarized from the Order, the PEA report (TRC, 1990h) and HLA's review of previous work and agency files. The accuracy of the following information has not been independently verified.

- The Site is known to have been the location of AGSTs, USTs, and sumps (see Plate 2 and Table 2). In the late 1920s, three large AGSTs and four earthen sumps were constructed at the Site. Two of these AGSTs were removed sometime prior to 1945 (Whittier College Fairchild Aerial Photograph Collection [Whittier], 1945).

- A large ponding area in the southeastern corner of the Site is evident in aerial photograph taken prior to 1945 (Whittier, 1928). During the 1940s, two large AGSTs and an earthen berm were constructed in the southwestern corner of the Site, and 23 small AGSTs were added in the northwestern corner (Whittier, 1945). Also during the 1940s, three of the four earthen sumps were apparently removed, the remaining sump was enlarged, and a new sump was added.

- During the 1950s, the remaining large AGST dating from the 1920s was removed, as well as seven of the 23 small AGSTs installed in the 1940s (Whittier, 1958). Also, in the 1950s, the ponding area in the southeastern corner became reduced in size.

- By 1962, eight more of the small AGSTs in the northwest corner of the Site were removed, along with three of the five remaining large AGSTs (Whittier, 1962). The ponding area was apparently no longer present by 1962.

- In 1967, existing sumps within the drainage area in the eastern part of the Site were cleaned of their mud and this material was spread throughout the Site to air dry. The base of the drainage area was scarified to a depth of 6 inches. The removed air-dried mud was mixed with dry, clean fill in proportions varying between 1 to 1 and 1 to 3 and placed to raise grades in the lower portions of the Site (Plates 5 and 6). The maximum depth of fill was reported to be 12 feet (Sladden Engineering, 1967), although the average depth of fill appears to be between 4 to 6 feet.

- Prior to 1974, the sole remaining sump had been filled in, and six new AGSTs were placed in the northwest corner (Aerial Photo, 1974). Two more AGSTs were placed in the northwest corner, and one AGST was placed in the west-central portion of the Site by 1981.

- During early 1990, the two large AGSTs in the southwestern corner (Powerine area) of the property were demolished and the underground piping leading to them removed. Currently (1993), the three AGSTs and a truck washdown sump on the northwestern part of the property are the only storage units remaining on the Site.

2.2.1 Getty Oil Company

Getty purchased the Site on May 26, 1934, from the J.W. Baker family, owners of the Site since 1887 (TRC, 1990j). Getty is reported to have used the Site until 1964 and to have stored crude oil and disposed of offsite-derived oil-well drilling fluids/muds at the Site. At various periods during Getty's operational tenure at the Site, there were 5 large AGSTs, 27 small AGSTs, and 12 earthen sumps. After 1964, Getty leased various portions of the Site as described below. Getty sold the Site to Walker on June 14, 1979.

Getty was acquired by Texaco, Inc. (Texaco), in 1984 through a purchase of stock. Getty's name was subsequently changed to Four Star Oil and Gas Company (Four Star). Texaco, as successor to Getty/Four Star, is presently the only potentially responsible party responding to the Order.

2.2.2 Mohawk Sales, Inc.

In 1964, Getty began leasing the southern portion of the northwest part of the Site (see Plate 2) to a company identified as Mohawk Sales, Inc. (Mohawk). Mohawk was issued a permit by the City of Santa Fe Springs to install a 6,000-gallon UST and pump at 11120 Bloomfield Avenue. Mohawk is reported to have used the leased area of the Site as a sales area for commercial transport and utility trailers. Based on this reported activity, it has been presumed by others (TRC, 1990h) that the UST was used to store diesel fuel. Mohawk leased this portion of the Site for approximately 5 years.

2.2.3 Lakewood Oil Service, Inc.

In 1965, Getty leased the northwestern corner of the Site (11020 Bloomfield Avenue) to Lakewood. Lakewood was apparently formed as a company in the 1950s to pick up and store used crank case motor oils until they could be recycled for further use. They also used their vacuum trucks to pick up materials from offsite washdown sumps and to pick up used contaminated oils from various industries. Hazardous waste manifests from 1983 (on file with the DTSC) indicate that at least two generators sent waste oils, possibly containing PCBs, to Lakewood at the Site. Lakewood operated essentially as a waste-oil transfer facility. Waste oil was brought in by vacuum trucks and discharged into a 12,000-gallon UST. The waste oil was pumped from the UST through various filters into several AGSTs for eventual resale. Approximately 120,000 gallons of waste oil was reportedly disposed of by Lakewood at BKK Corporation's landfill in West Covina, California, during 1981 and 1982. Lakewood reportedly filed for bankruptcy and vacated the Site in 1983 (TRC, 1990).

2.2.4 Norwalk Disposal Service

In 1974, Getty leased the portion of the Site formerly occupied by Mohawk to Norwalk Disposal Service (Norwalk), a trash collection business owned and operated by Walker. Norwalk stored empty trash trucks and containers at the Site and performed maintenance and cleaning activities. After the entire parcel was purchased from Getty by Walker in 1979, Norwalk continued to occupy its leasehold. TRC (1990h and 1990j) reported that a business identified as A&J Diesel occupied the Norwalk leasehold along with Norwalk during 1973. It is not known whether the Norwalk or A&J Diesel operations used the UST in the lease area.

2.2.5 Gross Construction

Walker leased the central portion of the Site (12600 Lakeland Road) to Gross Construction in 1981 to store heavy construction equipment, tractor trailer trucks, an aboveground 12,000-gallon diesel fuel tank surrounded by a containment wall, and several work trailers. Gross Construction occupied the Site until 1989.

2.2.6 Powerine Oil Company

Getty leased two large AGSTs (80,000 barrels each) to Powerine on the southwest portion of the Site in November 1968. Powerine operates a refinery located to the northwest, immediately across Lakeland Road. Underground pipelines running along Bloomfield Avenue connected these tanks to the refinery (Plate 2). Powerine stored and transferred jet fuel and gas oil at the Site between 1971 and 1983. Powerine received butane and liquefied petroleum gas at the Site from incoming railcars via a loading facility between 1969 and 1975 (Plate 2). Powerine transferred fuel oil via pipeline to the loading facility and then onto railcars along the eastern property line from 1976 until 1978. Powerine also loaded liquid asphalt onto railcars at the Site between 1981 and 1982 (Powerine, 1992a). Powerine leased the facilities and property until filing for bankruptcy in 1984. We understand that Powerine came out of bankruptcy in March 1989.

2.2.7 AIRCO Industrial Gases

An additional portion of the southern part of the Site was leased to Powerine by Walker in 1982. Powerine subsequently entered into a sublease agreement with AIRCO Industrial Gases (AIRCO) in February 1982. AIRCO operated an AGST at the Site that contained carbon dioxide, which was transferred by a pipeline from the Powerine refinery's hydrogen plant to the AIRCO tank, which is covered with insulation made of asbestos-containing material. Discharge from the AGST was to a truck loading facility that included a single truck scale. AIRCO abandoned the Site in 1986, and most associated equipment was removed (Powerine, 1992a).

2.3 PREVIOUS INVESTIGATIONS

A PEA report (TRC, 1990h) was prepared for Walker and its agent, Turner Development Corporation (Turner), in 1990. The purpose of the PEA was to initiate a DTSC overview of remedial planning for environmental cleanup of the Site. The PEA report summarizes past and current activities at the Site, particularly with respect to the management of hazardous wastes on the property. The results of 17 previous site investigations, prepared by four different consultants during the period from 1985 through 1990, are discussed in the PEA report. The previous site investigations were performed to assess the possible presence, nature, and extent of hazardous substances on the Site. The PEA report indicated that subsurface conditions at the Site had been investigated, at the locations shown on Plate 2, by the following:

- Ninety soil borings (119-foot maximum depth),
- Five groundwater monitoring wells (130-foot maximum depth),
- Forty-six exploration trenches (probably less than 10 feet deep),
- Forty-one soil-gas probes (typically 3 feet deep),
- Sixteen soil-gas monitoring wells (15 to 25 feet deep),
- Eighteen soil samples from tank and pipeline excavations, and
- Three asbestos samples from surface facilities.

Laboratory data from these investigations are summarized in Tables 3 through 9, which list all chemicals detected at the Site. TRC determined that Site soils were primarily impacted by hydrocarbon products, including waste oils, jet fuel, diesel fuel, and a limited amount of gasoline. Additional significant compounds found at the Site include PCBs, lead, barium, copper, and asbestos. Groundwater was found to contain petroleum hydrocarbons and some organic solvents. The distribution of the chemicals detected at the Site during previous investigations are presented on the following plates:

- Plate 7a - Existing PCB Data
- Plate 7b - Existing Metals Data
- Plate 7c - Existing Hydrocarbons
- Plate 7d - Existing Soil-Gas Data
- Plate 7e - Existing Groundwater Data

Subsequent to the PEA report, two quarterly groundwater monitoring reports were prepared for Walker/Turner (TRC, 1990g and 1990i). Data from these reports are shown on Plate 7e.

Brief descriptions of all site investigations performed to date are provided in the following sections:

2.3.1 Dames and Moore

From April 22 through 26, 1985, Dames and Moore supervised the drilling of eleven soil borings (Nos. 1 through 4, 5A, 5B, 6, 7A through 7C, and 8) throughout the Site for general assessment. The borings were drilled to depths varying from 14 to 70 feet below ground surface (bgs) using hollow-stem augers. Ten discrete and composite samples were collected and analyzed for:

- Total organic carbon (TOC);
- Total organic halogens (TOX);
- Volatile organic compounds (VOCs) (EPA Method 8010);
- Benzene, toluene, ethylbenzene, and xylenes (BTEX) (EPA Method 8020);
- Organochlorine pesticides and PCBs (EPA Method 8080); and
- Title 22 California Administrative Code (CAC) metals.

PCB-1248 was detected at a concentration of 94 milligrams per kilogram (mg/kg) at a depth between 2 and 3.5 feet bgs in the Lakewood Section. Lead was detected at a maximum concentration of 1,450 mg/kg. Several VOCs and BTEX compounds were detected at concentrations up to 62 mg/kg. Elevated barium concentrations were found in the Railroad Section (Dames and Moore, 1985).

On March 7, 1986, Dames and Moore supervised the drilling of six soil borings (5C to 5H) to further assess lead and barium concentrations detected in the Railroad Section during the initial investigations. The borings were drilled to depths ranging from 4 to 6 feet bgs. Soil samples were analyzed for CAC metals. Barium was detected in all the samples, with a maximum concentration of 1,120 mg/kg. Lead was detected at a maximum concentration of 98 mg/kg (Dames and Moore, 1986a).

In May 1986, the DTSC requested that analyses for PCBs be conducted on the samples collected March 7, 1986. The analyses were performed, and PCBs were not detected above a detection limit of 0.1 mg/kg (Dames and Moore, 1986b).

On September 18, 1986, Dames and Moore collected four grab samples (1 through 4) from the floor and walls of an excavation during removal of the 12,000-gallon waste-oil UST located north of the three existing AGSTs within the northwest portion of the Site. The samples were primarily collected from areas observed to exhibit stained soils. The samples were analyzed for CAC metals and PCBs (EPA Method 8080). Lead was detected at a maximum concentration of 1,100 mg/kg, PCB-1242 at a maximum concentration of 248 mg/kg, and PCB-1248 at a maximum concentration of 29 mg/kg (Dames and Moore, 1986a).

Between October 28 and November 4, 1986, Dames and Moore supervised the excavation of 32 trenches (A through FF) to assess the vertical and horizontal extent of the lead and PCBs in the area of the Lakewood facilities. The depths of the trenches were not reported but are presumed not to have exceeded 8 feet bgs. Thirteen soil samples collected from the trenches and two samples collected from stockpiled soils were analyzed for CAC metals and PCBs (EPA Method 8080). Two samples were analyzed for polynuclear aromatic hydrocarbons (PNAs) using EPA Method 8310. A maximum PCB concentration of 200 mg/kg was detected along with a maximum lead concentration of 2,470 mg/kg. Detectable PNA concentrations ranged from 0.24 to 4.5 mg/kg (Dames and Moore, 1986d).

2.3.2 EMCON

On July 7, 1988, EMCON supervised the drilling of 13 soil borings (B-1 through B-13) on the eastern portion of the Site to confirm previous work performed by Dames and Moore. The borings were drilled to a maximum depth of 5 feet bgs. One soil sample collected from each boring was analyzed for:

- VOCs (EPA Method 8240),
- Chlorinated pesticides and PCBs (EPA Method 8080),
- Barium (EPA Method 7080), and

- Lead (EPA Method 7420).

Lead and barium were detected in all the samples. A waste extraction test (WET) performed on the sample with the maximum lead concentration (640 mg/kg) yielded a result of 2.9 milligrams per liter (mg/l) soluble lead, which is below the soluble threshold limit concentrations (STLC) of 5.0 mg/l (EMCON, 1988a).

On September 2, 1988, EMCON completed three soil borings (B-14 through B-16) hand-augered to depths of 5 feet bgs in the south-central portion of the Site. One soil sample collected from each boring was analyzed for:

- VOCs (EPA Method 8240),
- Chlorinated pesticides and PCBs (EPA Method 8080),
- Barium (EPA Method 7080), and
- Lead (EPA Method 7420).

Lead and barium were detected in the three samples at maximum concentrations of 11.2 and 293 mg/kg (EMCON, 1988b).

Between December 14 and 16, 1988, EMCON supervised the drilling of four soil borings (E-1 through E-4) in the northeastern portion of the Site to depths of 40 to 115 feet bgs. Boring E-1 (115 feet bgs) encountered groundwater at a depth of 97 feet bgs. A total of 24 of the soil samples were analyzed for total petroleum hydrocarbons (TPH) using EPA Method 8015 (modified) and for BTEX using EPA Method 8020. TPH and BTEX were only detected in Boring E-1 at maximum concentrations of 3,350 mg/kg (TPH as gasoline at 80 feet bgs), 2,090 mg/kg (TPH as diesel at 95 feet bgs), and 128.3 mg/kg (total BTEX at 80 feet bgs) (EMCON, 1989).

In January 1989, EMCON installed two groundwater monitoring wells at unreported depths (but expected to be about 120 feet bgs). The wells were identified as EW-1 (northeast corner of Site) and EW-2 (west-central part of Site). Well EW-1 was reported to have 0.5

foot of liquid hydrocarbons floating on the groundwater. No analytical data were reported (EMCON, 1989).

2.3.3 Geoscience Analytical, Inc.

Between August and November 1988, GeoScience Analytical, Inc., collected 41 shallow soil-gas samples (P1 through P41) (average of 3 feet bgs), installed 16 vadose zone monitoring wells (1 through 8, and 1B through 8B) (21 to 25 feet bgs), and supervised the drilling of three soil borings (1 through 3) to 40 feet bgs at various locations on the Site.

- The first set of wells monitored soil gas from depths of 11 to 21 feet bgs, while the second set monitored soil gas from depths of 15 to 25 feet. Soil-gas samples collected were analyzed for C_1 to C_4 range hydrocarbons, carbon dioxide, nitrogen, oxygen, and isotopic abundances of carbon in methane and carbon dioxide. Soil samples were analyzed for TPH (EPA Method 8015 modified) and BTEX (EPA Method 8020).

- Maximum concentrations of hydrocarbon gases (187,140 parts per million by volume C_1 in Well 2B) were found in the northwestern and northeastern corners of the Site. BTEX concentrations in soil were reportedly detected at Boring 3 in the northeast corner of Site [Note: Report not available; data not shown on Plate 7d].

- Geoscience Analytical, Inc. concluded that two plumes of hydrocarbon gases were migrating onto the Site from the north (Geoscience Analytical, Inc., 1988a and 1988b).

2.3.4 TRC Environmental Consultants, Inc.

During October and November 1989, TRC supervised the drilling of 35 soil borings (TRC, 1990a). The TW-series borings were drilled to depths between 13 to 50 feet bgs, and TMB- and TSB-series borings were drilled to depths between 15 to 30 feet bgs. Three of the TSB-series borings (TSB-3, TSB-5, and TSB-7) were subsequently deepened and completed as groundwater monitoring wells (W-1 through W-3) at depths between 124 and 129 feet bgs. Thirteen test trenches (T-1 through T-13) were also excavated.

- Thirty-three samples collected from the TW borings were analyzed for PCBs using EPA Method 8080. PCB-1221 was detected at a maximum concentration of 140 mg/kg, and PCB-1242 was detected at a maximum concentration of 240 mg/kg. Detectable PCB concentrations extended to a depth of 15 feet bgs.

- Nineteen samples collected from the borings and two samples collected from the trench excavations were analyzed for TPH (EPA Method 418.1). Eight samples contained TPH over 1,000 mg/kg, with a maximum concentration of 150,000 mg/kg detected at a depth of 1.5 to 2 feet bgs (Trench T-3). A TPH concentration of 12,000 mg/kg was detected at a depth of 100 feet bgs (Boring TSB-7).

- Twenty-four sample collected from the borings and one trench sample were analyzed for TPH using EPA Method 8015 (modified). TPH was detected in six of the samples, with a maximum concentration of 12,000 mg/kg in Boring TSB-7 at a depth of 100 feet bgs. Four of these samples and the trench sample were analyzed for BTEX using EPA Method 8020. The maximum total BTEX concentration in the sample collected at a depth of 10 feet bgs from Boring TSB-6 was 146.54 mg/kg (benzene at 0.14 mg/kg).

- Three bulk material samples were collected from buildings and analyzed for asbestos. Only the sample collected from 200 square feet of insulation material within the AIRCO CO_2 processing unit was found to contain asbestos (40 percent chrysotile and 25 percent anosite). TRC observed the asbestos to be in a damaged and friable condition. [Note: A recent inspection by HLA indicated that only small areas of the outer skin of the insulation were damaged or missing.]

Between January 22 and 24, 1990, TRC supervised the drilling of ten soil borings (JB-1 through JB-10) ranging in depth from 101 to 119 feet bgs on the southwestern part of the Site. Thirty-five of the samples collected from the borings were analyzed for TPH as jet fuel and diesel using EPA Method 8015 (modified). TPH was detected in twelve of the samples with a maximum concentration of 10,000 mg/kg found in Boring JB-1 at a depth of 107.5 feet bgs. In most cases of detection, the TPH was identified as jet fuel (TRC, 1990b).

Between January 26 and 29, 1990, TRC collected six soil samples (PT-1 through PT-6) during removal of pipelines associated with the two large AGSTs on the southwestern part of the Site. The samples were collected from depths ranging between 10 to 13 feet bgs. The samples were analyzed for TPH as jet fuel and diesel using EPA Method 8015 (modified). TPH was detected at a maximum concentration of 2,900 mg/kg in Sample PT-6 from a depth of 12 feet bgs (TRC, 1990c).

On February 6, 1990, TRC supervised the drilling of five soil borings (FB-1 through FB-5) to depths between 40 and 50 feet bgs to further investigate the extent of jet fuel in soil north of the bermed area in the southwestern part of the Site. Six of the collected soil samples were analyzed for TPH using EPA Method 8015 (modified). The hydrocarbons did not chromatographically match the gasoline, diesel, or jet fuel standards used. The sample collected from a depth of 10 feet bgs in Boring FB-1 had a TPH concentration of 53 mg/kg. The analysis of the other samples yielded results less than the detection limit (TRC, 1990d).

On February 1, 1990, TRC observed the excavation and removal of four USTs at the Site. Eight soil samples were collected from the excavations and were labeled 1A and 1B through 4A and 4B. The samples were analyzed for TPH as gasoline and diesel and BTEX using EPA Methods 8015 (modified) and 8020. Only Sample 4B had detectable concentrations of TPH and BTEX, which were 24 and 4.9 mg/kg, respectively (TRC, 1990e).

On March 27, 1990, TRC supervised the installation of Well W-4 as a replacement for monitoring Well EW-2, which had been installed at the direction of EMCON. The well was drilled to 130 feet bgs. Four soil samples from among those collected were analyzed for TPH as gasoline and BTEX using EPA Method 8015 (modified) and 8020, respectively. Additionally, two samples were analyzed for TPH as diesel using EPA Method 8015 (modified). All results were below their respective detection limits (TRC, 1990f).

Between November 1989 and October 1990, four separate groundwater monitoring well sampling episodes and one single well sampling event were conducted by TRC. Groundwater samples collected were analyzed at least once for:

- VOCs (EPA Methods 601 and 624),
- BTEX (EPA Method 8020),
- TPH as gasoline and diesel (EPA Method 8015 modified), and
- Organochlorine pesticides and PCBs (EPA Method 8080).

BTEX and several other VOC compounds were detected. TPH was detected at a concentration of 9,800 micrograms per liter (μg/l) in Well EW-1. On September 21, 1990, benzene was detected at a concentration of 820 μg/l, toluene at 1,100 μg/l, and trans-1,2-dichloroethene at 44 μg/l in Well EW-1. BTEX and VOC concentrations were observed to decrease southward across the Site (TRC, 1990g and 1990i).

2.4 REGIONAL GEOLOGY AND HYDROGEOLOGY

The Site is located on the Santa Fe Springs plain; part of the Los Angeles Coastal plain. The Santa Fe Springs plain is a tectonic uplift (anticline) that exposes upper Pleistocene-Age Lakewood Formation sediments at the surface, which are underlain by sediments of the San Pedro Formation (Plate 8). Prominent area features include the Puente and Coyote Hills, to the northeast, east, and southeast; and the San Gabriel River to the west of the Site.

2.4.1 Lakewood Formation

The Lakewood Formation consists of interbedded clays, silts, silty sand, and sands indicative of stream-type alluvial and flood-plain deposits. The Lakewood Formation ranges from 100 to 180 feet thick in the Santa Fe Springs/Norwalk area (California Department of Water Resources [DWR], 1961).

In the site vicinity, the Lakewood Formation is comprised of the Bellflower aquiclude (upper unit) and the Exposition and Gage aquifer. The Bellflower aquiclude consists of sandy and gravelly clays and silts in the site vicinity. The Exposition and Gage aquifers consist of predominantly sands and fine gravels with discontinuous, thin-bedded silts, and clays. These aquifers have an approximate combined thicknesses of 100 to 150 feet, approximately half of which is saturated. The Gage aquifer base also represents the base of the Lakewood Formation. Presently, the City of Santa Fe Springs does not operate any wells that extract groundwater from the Exposition or Gage aquifers (Santa Fe Springs Public Works Department, 1993).

2.4.2 San Pedro Formation

The lower Pleistocene San Pedro Formation underlies the Lakewood Formation. In the site vicinity, the San Pedro Formation is approximately 750 thick and consists of stratified silt, silty sand, sand, and gravel. The formation has been divided into various stratigraphic units or members (aquicludes and aquifers); only the aquifers have been named. In downward succession, the uppermost aquifers are: the Hollydale, Jefferson, and Lynwood.

The discontinuous Hollydale aquifer consists of silty sand and sand. Maximum thickness in the Site vicinity is approximately 50 feet; the aquifer may extend from approximately 50 to 100 feet bgs. Generally, the aquifer does not yield large quantities of water because of its composition and lack of continuity. The aquifer receives recharge principally where it merges with overlying aquifers such as the Gage aquifer (DWR, 1961).

The Jefferson aquifer underlies the Hollydale aquifer and is separated from it by aquicludes of the San Pedro Formation. Sediments within the aquifer consist of clayey sand, sand, and gravelly sand. Less than 10 percent of the wells in the Central Basin are perforated in this zone, which is not considered an important water-producing aquifer (DWR, 1961).

Deeper aquifers (including the Lynwood, and the underlying Silverado and Sunnyside) are the major water-producing zones in the area. These aquifers have all been affected, to some extent, by structural folding and faulting. Structural lows, created by faulting and synclinal folding, have formed groundwater reservoirs in these zones. The aquifers range in thickness from less than 50 to 500 feet. Aquifer sediments generally consist of coarse-grained sands and gravels interbedded with lenses of silt and clay. Aquifer zones are separated by aquicludes. Well yields range up to 4,700 gallons per minute.

2.5 LOCAL GEOLOGY AND HYDROGEOLOGY

Local geologic and hydrogeologic information has been obtained through previous investigations at the Site and by review of data generated by subsurface investigations at nearby facilities.

Native soils are found at the surface on the western half of the Site, including the Lakewood Section. Artificial fills cover most of the eastern half of the property, including the Railroad Section. Original grade at the Site consisted of a relatively flat area on the western portion of the Site at an elevation of approximately 140 feet MSL, while the eastern portion of the Site grade consisted of a natural drainage with a base elevation of approximately 136 feet MSL in the northeastern part of the Site and 130 feet MSL in the southeastern part of the Site (USGS, 1925). In 1967, the drainage was filled to current grades with dried mud excavated from previous sumps and mixed with imported soils (Sladden Engineering, 1967). The resulting fill has been described as brown silt with fine-grained sand and some clay (Dames and Moore, 1985). The estimated extent and thickness of site fill is shown on Plate 7.

The Site is immediately underlain by the Lakewood Formation, comprised here of three hydrostratigraphic units: the Bellflower aquiclude, the Exposition aquifer, and the Gage aquifer. The San Pedro Formation is found beneath the Lakewood Formation, with the uppermost part of the San Pedro Formation consisting of an approximately 60-foot-thick unnamed aquiclude (aquitard) (DWR, 1961).

Soil samples and logs of borings drilled at the Site as summarized on the cross sections (Plates 9a through 9c) indicate that the shallow, near-surface soils constitute an upper fine-grained zone (Bellflower aquiclude) consisting mostly of silt, mixtures of clay and fine-grained sand to a depth of 15 feet bgs. An intermediate coarse-grained zone (Exposition aquifer; 15 to 105 feet bgs) consists predominantly of fine- to medium-grained, well-sorted sands with some admixed silt and clay and interbedded layers and lenses of coarse-grained sand and gravel, with a 15-foot-thick layer of fine- to coarse-grained sands and gravels at the base. A lower fine-grained zone (unnamed aquiclude) consisting of silt and fine-grained sand is found from 105 to 130 feet bgs beneath the western third of the Site. At these depths, sand and gravel (Gage aquifer) are found beneath the eastern two-thirds of the Site as the aquiclude apparently pinches out (Plates 9a through 9c).

Offsite subsurface geologic conditions to the north and northwest (Powerine refinery) and to the west (Metropolitan State Hospital), where subsurface data are available, consist of an upper fine-grained zone (Bellflower aquiclude) from the surface to a depth ranging between 28 and 79 feet bgs (generally consisting of two silt layers of variable thickness separated by a 10- to 15-foot-thick sand and gravel layer), a coarse-grained zone (Exposition aquifer) consisting of sand, with discontinuous lenses of gravels, silts, and clays (50- to 70-feet thick), and a lower fine-grained zone (unnamed aquiclude) consisting of a silty clay with zone sand and gravel that extends from 100 feet bgs to at least 127 feet bgs (International Technology Corp. [IT], 1986 and 1987); The Earth Technology Corp. [ET], 1991).

Depth to groundwater ranges from 85 feet (Powerine refinery) to 100 feet (northeastern corner of the Site) to 107 feet (southwestern corner of the Site). Saturated thickness within the Exposition aquifer ranges from 20 feet (Powerine refinery) to 0 feet (southwestern corner of Site) under unconfined conditions. Slug and pump tests performed at the Powerine refinery indicate a transmissivity range of 124 gallons per day per foot to 13,613 gallons per day per foot within this upper aquifer (IT, 1987). These aquifer test results were interpreted to indicate a highly heterogeneous aquifer containing significant boundary effects (IT, 1987). Hydraulic gradients at the Site and in the vicinity range from 0.008 to 0.011 with groundwater flow directions to the south-southwest (IT, 1987; TRC, 1990i), as shown on Plate 7e.

2.6 REGIONAL GROUNDWATER CONDITIONS

The site is located in an area of historically heavy industrial activity and, as a consequence, at least 102 properties and businesses within an approximately 1-mile radius of the Site have been identified on one or more environmental regulatory lists, such as the National Priorities List, CERCLIS, Cortese List, ASPIS, etc. A number of these properties, several of which are close to and upgradient of the Site (Plate 1), have documented groundwater contamination problems that involve petroleum hydrocarbons and/or organic solvents.

Powerine, Ashland Chemical Company (Ashland), and Yozya-Shoemaker Industrial Park (Yozya) are the three closest facilities, upgradient of the Site, that have groundwater contamination problems. Although liquid hydrocarbon product and dissolved petroleum hydrocarbons are present at the Powerine facility and to the south beneath the Metropolitan

State Hospital (Powerine, 1990c), this area of contamination is to the west and not directly upgradient from the Site. With the possible exception of some dissolved petroleum hydrocarbons in the extreme northwest corner of the Site, the Powerine contamination is not likely to have impacted groundwater beneath the Site. The extent of the groundwater problems at Ashland and Yozya are discussed below.

Ashland is located at 10505 Painter Avenue in the City of Santa Fe Springs, approximately 3/4 of a mile northeast of the Site (Plate 1). This location is directly upgradient of the Site, as indicated by the groundwater contours on Plate 7e. Ashland has historically been used for the storage, blending, and distribution of petroleum fuels, organic solvents, and acids since the late 1950s (Ecology and Environment [E&E], 1991). As of 1991, nonaqueous phase liquids (NAPLs) and organic vapors were being recovered through groundwater (20,000-gallons per day) and vapor extraction systems (E&E, 1991). Triannual reports on groundwater monitoring and sampling were prepared and sent to the RWQCB by Ashland (TRC, 1990g; E&E, 1991). Dissolved contaminants detected at Ashland include trichloroethene (TCE); 1,1-dichloroethane (1,1-DCA); 1,2-dichloroethane; 1,1,1-trichloroethane; tetrachloroethene (PCE); 1,1-dichloroethene; vinyl chloride; methylene chloride; benzene; and toluene (TRC, 1990g; E&E, 1991).

The Yozya site is located at 10600 Shoemaker Avenue in the City of Santa Fe Springs. This site was formerly owned by Mobil Oil Corporation and was used to conduct oil well drilling operations, which included the use of drilling-mud sumps. Groundwater beneath the Site has been found to be contaminated with fuel hydrocarbons and chlorinated VOCs. Dissolved contaminants detected at Yozya include TCE, 1,1-DCA, 1,1-DCE, PCE, vinyl chloride, methylene chloride, benzene, tetrahydroforan (TRC, 1990g). During a July 1989 sampling event at this site, a groundwater sample collected from a downgradient, offsite well, located approximately 1/4 mile northeast of the Walker Site, was found to contain benzene (170 ug/l), 1,1-DCA (710 ug/l), and vinyl chloride (430 ug/l) (TRC, 1990g).

The RWQCB wrote groundwater contamination clearance letters for the Yozya site in March 1989 (RWQCB, 1989) and for the McGranaham Carlson Commerce Center, which is across Shoemaker Avenue from Yozya, in July 1991 (RWQCB, 1991). The letters absolved the site owners of responsibility for groundwater contamination beneath their sites. The RWQCB concluded that the groundwater contamination beneath the two sites originated from offsite sources to the north and east.

3.0 INITIAL EVALUATION

3.1 HAZARDOUS CHEMICAL CHARACTERISTICS

Hazardous materials historically stored or used at the Site are identified in Table 1. These materials included such chemicals as PCBs, heavy metals, volatile chlorinated and polynuclear aromatic hydrocarbons, and asbestos. Available analytical data indicate that Site soils are primarily impacted by petroleum hydrocarbons, metals, and PCBs; groundwater contains petroleum hydrocarbons and some organic solvents.

More than 200, 55-gallon drums are located near the southeast corner of the Site in the Railroad Section. A few drums were found in the Lakewood Section. These drums remain from previous site investigations and are thought to contain drill cuttings, well development/purge water, and disposable clothing/supplies from onsite workers. According to the DTSC, approximately 50 drums have been overpacked by the DTSC. At least 75 of the drums are now empty. Several drums contained a black, tarry substance that is believed to be residue from pipeline removal at the Site. A Drum Removal Plan, dated March 15, 1993, (HLA, 1993) was approved by the DTSC on April 13, 1993.

The hazardous characteristics of the more prevalent chemical compounds detected at the Site are discussed below within general categories. This discussion describes the general potential health effects and the nature and extent of the chemical compounds that have been considered in developing the RI/FS workplan. The intent is to consider the potential impact on public health of the chemical compounds detected in soil, groundwater, and air media.

3.1.1 Polychlorinated Biphenyls

PCB concentrations ranging from 0.014 to 248 mg/kg were detected in soil in the Lakewood section. PCBs detected included PCB-1221, 1242, 1248, and 1260. The adverse health affects of PCBs include chloracne, liver dysfunction and impaired, reproductive performance. PCBs are also considered potential carcinogens. PCB distribution appears restricted to shallow soils in a limited area around the AGSTs associated with the former Lakewood facility (Plate 7a).

3.1.2 Metals

Heavy metals have a wide range of toxicological effects depending upon the metal and its form. Metals detected at the Site include lead (2.2 to 2,470 mg/kg), copper (1.0 to 5,140 mg/kg), and barium (36 to 2,520 mg/kg). The metals detected at the Site are expected to be present in their inorganic form and could become an exposure problem through ingestion or inhalation. Most metals (and metal compounds) are not easily absorbed through the skin except organometallic compounds, such as tetraethylead. Carcinogenic properties of heavy metals are most often associated with inhalation of metal dusts or vapors. Lead distribution appears restricted to shallow soils with the highest detected concentrations associated with the soils in the vicinity of the former Lakewood facility (Plate 7b). Barium distribution is mainly in the Railroad Section within the artificial fill (Plate 7b). Copper was only detected at elevated concentrations in one soil sample.

3.1.3 Chlorinated Hydrocarbons

Chlorinated hydrocarbons have been detected in two soil samples at the Site. The constituents detected were TCE, PCE, 1,1,1-TCA, and 1,1-DCA at concentrations of 32, 12, 9.7, and 4.4 mg/kg, respectively. These compounds behave similarly in the environment and have intermediate to high mobility, but have only minor potential for bioaccumulation. Chlorinated hydrocarbons are volatile and can, therefore, present a potential for air-route exposure. Amounts of volatilization are dependent upon initial concentrations, pressure, and temperature. Adverse health effects from exposure to chlorinated hydrocarbons may include headache, dizziness, visual disturbances, central nervous system depression, skin irritation, and drowsiness. Prolonged exposures can result in liver or kidney damage. TCE and PCE are known carcinogens, and 1,1-DCA is a potential carcinogen. Long-term chronic exposure to 1,1,1-TCA and the other chlorinated hydrocarbons may result in liver damage. The chlorinated hydrocarbons in soil were found at one location in the Lakewood Section in the vicinity of the former UST used as a sump (Plate 7c) and at one location in the Railroad

Section. Concentrations were low in both cases. Chlorinated hydrocarbons are found in low concentrations in all the groundwater monitoring wells (Plate 7e). Regional data suggest that the dissolved chlorinated hydrocarbons originate offsite (TRC, 1990g).

3.1.4 Volatile Aromatics

Volatile aromatic hydrocarbons (including BTEX) are common components of gasoline and most crude oils. As a group, volatile aromatics cause central nervous system depression from acute exposure and can cause liver and kidney damage as well as teratogenic effects from chronic exposure. Benzene, a known carcinogen, was detected at a maximum concentration of 11.5 mg/kg. Toluene and xylenes were detected at maximum concentrations of 12.5 and 44 mg/kg, respectively. These compounds are associated with all areas of the Site where hydrocarbon contamination was identified (Plates 7c and 7e). Hydrocarbon vapors including methane are most prevalent in soil at the northern property line (Plate 7d) and suggest an offsite source.

3.1.5 Polynuclear Aromatic Hydrocarbons

Polynuclear aromatic hydrocarbons (PAHs) are typically found in petroleum-based oils and also formed during hydrocarbon combustion processes. Potential sources of onsite PAHs are primarily waste-oil residues. PAHs detected at the Site were phenanthrene (4.5 mg/kg), naphthalene (2.2 mg/kg), pyrene (1.5 mg/kg), fluorene (1.4 mg/kg), fluoranthrene (1.2 mg/kg), benzo(a) pyrene (0.53 mg/kg), and anthracene (0.24 mg/kg). According to the American Conference of Governmental Industrial Hygienists, the benzene-soluble PAHs, such as those listed above, can be considered human carcinogens. As coal-tar volatiles, an 8-hour timeweighted average threshold limit value of 0.2 milligrams per cubic meter (mg/m^3) has been assigned to these compounds. PAHs have only been analyzed for in soil samples collected near the AGST within the Lakewood Section (Plate 7c).

3.1.6 Asbestos

Asbestos (chrysotile and anosite) was detected in the bulk insulation material from the former AIRCO CO_2 processing unit adjacent to the railroad siding. Approximately 200 square feet of this material was observed at the processing unit in a friable condition (TRC, 1990a); however, only a small portion of the outer skin of the insulation is damaged or missing. Exposures to asbestos fibers through inhalation has been associated with development of asbestosis (form of lung disease) and pleural mesothelioma (malignant tumors of the tissue surrounding the lungs). The risk of developing malignant tumors is greatly enhanced in smokers.

3.2 RELEASE PATHWAYS AND RECEPTORS

Chemical releases into the soil have occurred in the past (see Section 2.3). Potential primary sources for past releases include AGSTs, USTs, drums, pipelines, sumps, and possibly railroad tank cars. Mechanisms for these direct releases into the soil may have included spills, value failures, overfills, and leaks. Because the Site is inactive and vacant, as well as fenced and locked, future direct chemical release into the air, soil, or groundwater are not likely once the drums are removed.

Areas of concern expressed by DTSC in the Order are:

- Transient persons seeking shelter in the existing AGSTs (exposure to PCB smoke, transformation of PCBs to dioxins and furans);
- Persons onsite inhaling dusts containing lead, barium, and possibly copper; and
- Children or transients being exposed to friable asbestos.

The major routes of exposure for human receptors appear to be inhalation, ingestion of soil, or dermal contact with contaminated soil.

Contaminated soil represents the major source of potential future chemical release from the Site. Potential release mechanisms include dust and/or volatile emissions into the air, infiltration into the groundwater, and storm-water runoff from surface water and sediments. Potential exposure pathways and receptors are discussed individually below.

3.2.1 Air

Potential airborne migration of chemical-laden dusts or particulates and volatilization of chemicals from near surface soil could result in inhalation exposures to receptor populations. Receptors could include any onsite personnel and offsite populations (residences or businesses) near the Site.

3.2.2 Soil

Direct contact with chemicals contained in the soil represents an exposure pathway for onsite personnel. Incidental ingestion and dermal contact could also occur. Because the facility is fenced and locked and access is restricted to authorized personnel, public access is considered unlikely. Consequently, the current risks of exposure to offsite populations are considered minimal.

3.2.3 Surface Water

Migration of chemicals by surface waters could occur during rain storms through surface runoff. Population exposures to surface water can occur through ingestion, inhalation of volatile compounds, and direct contact. Receptors could include both onsite personnel and offsite populations, as well as aquatic life.

3.2.4 Groundwater

Migration of chemicals into groundwater could occur by infiltration of surface water, leaching contaminated soil and percolation to the groundwater table. Depending on usage of pumped groundwater, exposure routes could include ingestion, inhalation of volatile compounds, and direct contact.

3.3 CONCEPTUAL SITE MODEL

A conceptual site model is presented on Plate 10. The model is a graphical representation of primary and secondary release sources, primary and secondary release mechanisms, potential pathways, exposure routes, and receptors. The conceptual model serves as a preliminary organization of relevant site information, so that major release and exposure pathways can be defined. This model will be refined as data collected during the RI are evaluated.

4.0 WORKPLAN RATIONALE

Previous investigations conducted at the Site have demonstrated that chemicals of concern have been released at the Site. The releases probably occurred through spills, overfills and/or leaks from AGSTs, USTs, drums, and pipelines. The Order has identified the chemicals of concern as PCBs, lead, copper, and asbestos. Petroleum hydrocarbons, chlorinated hydrocarbons, and barium have also been detected at the Site.

The objectives of the RI/FS are to evaluate the nature and extent of these chemicals, and to assess whether additional investigation and/or remediation is warranted. The data to be collected by the RI will be used to perform FSs for the Lakewood and Railroad Sections of the Site and to select appropriate remedial actions to mitigate subsurface contamination, if warranted. The RI does not include the Powerine area, as the RWQCB has jurisdiction in this portion of the Site.

The scoping requirements of the National Contingency Plan ([NCP], 40 Code of Federal Regulations [CFR], and 300.430 [b]) have been followed for development of the RI.

4.1 EXISTING DATA

Data from the previous investigations conducted at the Site (as described in Section 2.3) are presented in Tables 3 through 9, and on Plates 7a through 7e. Results of these previous sampling and characterization activities are discussed in Section 3.0 and are summarized below.

Data from the previous investigations indicate that several areas of subsurface soil within the Site have been impacted primarily by hydrocarbons (Plate 7c). The largest of these areas are in the Lakewood Section. The northernmost of the hydrocarbon-impacted areas (coincident with Lakewood's operations) also contains PCBs (Plate 7a) and elevated concentrations of lead and barium (Plate 7b). Small areas of hydrocarbon-affected soils were detected in the Railroad Section (Plate 7c). Lead and barium appear to be found in varying concentrations (but usually less than 10 times the soluble threshold limit concentration) throughout the

Railroad Section fills within the former drainage area (Plate 7b). Asbestos contamination appears to be restricted to the insulation material within the AIRCO structure inside the Railroad Section.

4.2 DATA NEEDS

As shown on Plate 11, additional investigation of Site soils is proposed for two areas within the Lakewood Section and three areas within the Railroad Section. These areas are where chemicals of concern were previously detected in soil, or are within the former drainage and ponding areas in the eastern portion of the Site, where previous data may be incomplete because of limited sampling and boring depths. The specific locations where 19 additional soil borings are proposed are described in detail in Section 5.3.2. These investigations will target the following areas:

- PCB/hydrocarbon-impacted area at the former Lakewood facility (Lakewood Section),
- Hydrocarbon-impacted area at the former Getty/Mohawk/Norwalk Disposal/ A&J Diesel Lease (Lakewood Section),
- Pond area and former drainage area (Railroad Section), which is potentially impacted by hydrocarbons, lead, and barium,
- Former Powerine loading rack location (Railroad Section), which is potentially impacted by hydrocarbons.
- Hydrocarbon-impacted area of the northeastern corner of the Site (Railroad Section).

The available groundwater data for the Site and for other facilities in the area (Section 2.6) indicate that local groundwater contains petroleum hydrocarbons and some chlorinated compounds. There is no clear evidence that operations in either the Lakewood or Railroad Sections of the Site have impacted groundwater. In fact, the concentrations of chemicals in groundwater appear to be greatest in the northeast corner of the Site and to decrease across the Site to the southwest in the direction of groundwater flow. To more completely address the question of whether the chemicals detected in groundwater are from an offsite source to the northeast, additional groundwater monitoring and sampling of all existing wells (as described in Section 5.3.2) are needed. One additional groundwater monitoring well is planned for the southeast corner of the site, as shown on Plates 7e and 11. This well will obtain water level and water quality information downgradient of the pond area and former drainage area of the Railroad Section.

An inspection of the asbestos-containing material (ACM) in the former AIRCO CO_2 processing unit (Plate 11) is needed to assess the present condition of the ACM and to evaluate whether interim remedial measures (stabilization) are needed.

Air quality monitoring is needed to assess present ambient air quality conditions. This information will be used to establish "baseline" air quality criteria for use during the RI and subsequent remedial actions.

The stormdrain that passes beneath the central portion of the Site should be investigated to determine whether surface water runoff entering a catch basin at the south end of the Railroad Section (Plate 11) may contain chemicals of concern. Additionally, the Site should be canvassed for other areas of surface water runoff.

4.3 RI/FS SCOPE

The RI will consist of collecting soil, groundwater, surface water, and ambient air samples for chemical analysis, from areas of the Site where previous investigations have identified the presence of contaminants or in areas that have not been fully characterized.

Proposed sampling/well locations are shown on Plate 11 and are discussed in Section 5.3.2 of this workplan. Data collected during the RI field study will be completed and reviewed as the investigation progresses. If needed, additional samples will be added to adequately characterize the vertical and horizontal extent of any elevated chemical concentrations detected. Proposed additional sample locations will be reviewed with the DTSC prior to performing field work.

The RI field study is intended to generate sufficient data to adequately characterize subsurface conditions at the Site and the nature and extent of any elevated concentrations of chemicals. A baseline risk assessment will be conducted to evaluate the need for site remediation.

The bulk of the FS will be conducted after the RI field study is complete, although the RI and FS may overlap. Information necessary for the selection and analysis of remedial alternatives will be gathered during the RI. Possible remedial actions (including possible interim action regarding asbestos removal) will be selected early in the RI and screened/analyzed as the RI progresses. The FS scope will be refined during the RI process. The probable nature of the FS is described in Sections 5.7 through 5.11.

5.0 RI/FS TASKS

The RI/FS program for the Lakewood and Railroad Sections, respectively, has been divided into 11 main tasks as follows:

- Project planning
- Public participation

Remedial Investigation

- Field investigation
- Sample analysisand data validation
- Data evaluation
- Baseline risk assessment
- Treatability study/pilot testing
- Remedial investigation report

Feasibility Study

- Remedial alternatives development/screening
- Detailed analysis of alternatives
- Feasibility study report

These tasks are described in detail in subsequent sections of this workplan.

5.1 PROJECT PLANNING

Project planning has been nearly completed and is summarized in this workplan. Project planning consisted of reviewing existing data and information available in DTSC, RWQCB, and other agency files to develop an understanding of the site background and physical setting; identifying chemicals used at the site; conducting an initial evaluation and developing a preliminary conceptual model of possible pathways, receptors, and impacts of chemical constituents of concern; developing a scope of work for the RI/FS; establishing quality assurance/quality control (QA/QC) criteria and project procedures; and preparing a preliminary schedule. Planning activities have culminated in the preparation of this workplan, which includes the following subplans;

- Project Management Plan (Appendix A),
- Data Management Plan (Appendix B),
- Quality Assurance Project Plan (QAPP) (Appendix C),
- Field Sampling Plan (FSP) and Project Procedures Manual (PPM) (Appendix D), and
- Health and Safety Plan (Appendix E).

Project planning will be considered complete when this RI/FS workplan (including the Appendices) has been approved by the DTSC.

5.2 PUBLIC PARTICIPATION

A public participation plan (PPP) is being developed for approval by the DTSC. The PPP will be consistent with the requirements of 40 CFR 430(c). The objectives of the PPP will be to assess existing community concerns regarding planned and ongoing remedial studies at the Site, including all phases of assessment and remediation; to establish procedures for accurate and timely release of information to potentially affected and interested citizens, elected officials, public interest groups, and agency officials; and to present methods to facilitate communication among the DTSC, the PRP group, and the community at large. The PPP will be updated as needed throughout the remedial assessment and implementation process.

The PPP will be implemented under the direction of the DTSC. The PPP will be tailored to respond to the expressed needs and concerns of parties potentially affected by contamination at the site. The plan will include a site mailing list, a location for access to public information, provisions for public meetings (if needed), and a means to address public fact sheets. Interviews with the public were conducted to assess the current level of public concern.

An initial element of the public participation program will be to distribute an informational fact sheet about the planned RI/FS activities to be conducted on the behalf of Texaco and the DTSC. An initial fact sheet is being developed for approval by the DTSC.

REMEDIAL INVESTIGATION

5.3 FIELD INVESTIGATION

There are two objectives of the RI field study:

- Obtain information on soil and groundwater conditions, local geology, and hydrogeology in areas of the site where known or suspected releases to the ground have occurred, or where no site data are available, and
- Evaluate the areal and vertical distribution of chemicals in soil and groundwater in order to develop information necessary for conducting a baseline risk assessment and for screening and detailed analysis of remedial alternatives.

In preparation for the field investigation, a sampling and analysis program (SAP) has been developed. The SAP consists of (1) the QAPP (Appendix C), (2) the FSP (Appendix D), and (3) the PPM (Appendix D). The QAPP includes both QA and QC procedures. For this work, QA is defined as the integrated program designed to assure reliability of investigation data. QC is defined as the routine application of specified procedures to obtain prescribed standards of performance in the investigation process. HLA will be responsible for implementing the QAPP to assure that the precision, accuracy, and completeness of data are known and documented. The FSP presents the details of the scope of work and sampling requirements for the field investigations. The PPM provides detailed procedures for field activities.

A Health and Safety Plan describing field safety procedures and personal protection monitoring requirements in accordance with 29 CFR 1910.120 is presented in Appendix E. This plan will be adhered to by all field staff and associated contractors conducting work at the site. The plan will be enforced by the Site Safety Officer (SSO).

5.3.1 Background Data Collection

Existing literature pertaining to climate, surface water, human populations, land use, demography, and biota will be collected and reviewed. Aerial photographs of the site vicinity also will be reviewed. This information will be utilized during the baseline risk assessment.

Available data pertaining to upgradient industrial facilities within 1 mile of the site will also be collected and reviewed. Water quality, well construction details, and geologic logs for existing active water levels within 1 mile of the site will be reviewed. The information will be used to assess the potential for, and nature of, possible groundwater contamination upgradient of the site. Information may also be used to help establish "background" groundwater quality, and regional geology and hydrogeology.

Accurate topographic location of borings/wells and areas that could potentially be contaminated is critical. Therefore, a clean, legible copy of the topographic map (Plate 5), prepared by Willdan Associates (Willdan, 1988) will be obtained.

Available maps, showing the location of subsurface piping at the facility, have been located and reviewed. Underground piping has been plotted on the site map (Plate 2). Underground utilities (gas, water, and electric) are not known to presently exist at the Site. Numerous crude oil and/or refined product pipelines are known to exist beneath Lakewood Road north of the Site.

5.3.2 Site Investigations

Ambient air quality at the Site will be assessed by sampling at upwind and downwind locations at the perimeters of both the Lakewood and Railroad Sections. Daily samples collected over a 1-week time span will be analyzed for:

- Volatile hydrocarbons, EPA Method T014,
- Semivolatile hydrocarbons, EPA Method T013, and
- Metals, inductively coupled plasma (ICP) techniques.

The subsurface investigations will consist of drilling soil borings; collecting soil samples; drilling, logging, installing, developing, and sampling of a groundwater monitoring well; surveying the soil borings and monitoring well locations and elevations; and measuring water levels; as described in the FSP (Appendix D). Proposed boring and well locations (Plate 11) will be cleared for utilities and, if necessary, locations will be adjusted. Required permits will be obtained prior to beginning the subsurface investigation, as specified by 40 CFR 300.400(e).

The initial field investigation phase will consist of drilling 19 soil borings (8 in the Lakewood Section and 11 in or near the Railroad Section) using a hollow-stem auger rig. Soil samples will be collected from the borings at 5-foot-minimum intervals and at stratigraphic changes.

Borings in the Lakewood Section are planned to be 30-feet deep, which is below the depths of elevated chemical concentrations detected by previous investigations. In the vicinity of the PCB-impacted area (Plate 7a), three borings will be drilled and sampled to confirm existing conditions and to further delineate the lateral extent of PCB-impacted soil contamination where undefined. Three additional borings will be used to further assess the vertical and lateral extent of hydrocarbons within the same general vicinity of the Lakewood section (Plates 7c and 11). Two borings will be drilled and sampled in the southern portion of the Lakewood Section within the hydrocarbon-impacted area previously investigated by trenching (Plates 7c and 11) to assess the vertical extent of hydrocarbons within this area.

Within the Railroad Section, a total of six borings (typically 20 feet deep) will be drilled and sampled in the former drainage area (now filled); Plates 2, 6, and 11. Two of the borings will be placed in the former ponded area at the southern end of the Railroad Section. Four of the borings (20 feet deep) will be drilled in the vicinity of previous sump areas in the former drainage course.

One boring (30 to 70 feet deep) will be placed in the northern part of the Railroad Section (Plate 11) to assess the distribution of hydrocarbons in soil adjacent to Lakewood Road to determine if an offsite source (such as crude oil and/or refined product pipelines beneath the road) exists. Also within the Railroad Section, four soil borings will be drilled and sampled to a maximum depth of 10 feet bgs in the vicinity of Powerine's former loading rack facility (Plate 11), where hydrocarbon-impacted soil has previously been detected.

An additional boring will be drilled approximately 125 feet deep in the southeast corner of the Site near the Railroad Section (Plates 7e and 11). This boring will be converted to a groundwater monitoring well so that water level and water quality data can be obtained downgradient (southwest) of the former pond area at the southern end of the Railroad Section.

Soil samples will be collected and submitted for chemical analysis as detailed in the Field Sampling Plan (Appendix D). The results from the previous site investigations have been used to focus the chemical testing parameters. Because pesticides, cyanide, and most of the CAC metals (such as mercury) were either not detected or detected at inferred background concentrations, these chemicals are not included in the proposed sampling and analysis program. It is anticipated that all collected soil samples will be analyzed for:

- Total fuel and extractable hydrocarbons, EPA Methods 8015 modified (as diesel and gasoline),
- Volatile organic compounds, EPA Method 8260,
- Semivolatile organic compounds, EPA Method 8270,
- Total petroleum hydrocarbons, EPA Method 418.1.

Samples collected within the upper 20 feet will be analyzed for:

- Lead, EPA Method 7421, and
- Barium, Method 7081.

All samples collected within the former Lakewood Oil Service Lease in the Lakewood Section will be analyzed for PCBs by EPA Method 8080.

The new groundwater monitoring well and all existing wells will be developed prior to monitoring, purging, and sampling. The new well and all existing wells will be monitored, purged, and sampled twice during the RI. Groundwater samples will be analyzed for:

- Volatile organics, EPA Method 8260,
- Total fuel extractable hydrocarbons, EPA Method 8015 modified, and
- General minerals and trace metals.

Surface water and/or sediment samples will be collected (if present) from the stormdrain at the inlet near the southern end of the Railroad Section (Plate 11). Upstream water and/or sediment samples will also be collected from the stormdrain inlet north of the Site and across Lakeland Road (Plate 11). Prior to collection of surface water and/or sediment samples, the Site will be canvassed for any other existing stormwater runoff catch basins, which, if found, will also be sampled. Surface water and/or sediment samples will be collected following procedures outlined in the Field Sampling Plan (Appendix D). The surface water and/or sediment samples will be analyzed for:

- Hydrocarbons, EPA Method 8015 modified,
- Volatile organic compounds, EPA Method 8260,
- Semivolatile organic compounds, EPA Method 8290,
- Total petroleum hydrocarbons, EPA Method 418.1,
- Lead, EPA Method 7421,
- Barium, EPA Method 7081, and
- Polychlorinated biphenyls, EPA Method 8080.

5.3.3 Interim Remedial Measures

Prior to and during the RI (and subsequent FS activities) the current interim remedial measures (IRMs) will be continued, as required by the Order. These IRMs now include:

- Monthly inspection, repair, and reporting of the condition of the perimeter fence around the Site, including the hazardous substances warning signs, and

- Periodic control and removal of weeds and brush on the Site in accordance with the requirements of the City of Santa Fe Springs fire code.
- Removal of the 200 or more, 55-gallon drums in the southeast corner of the Site, in accordance with the approved Drum Removal Plan.

If additional site data indicate the need for other IRMs, the requirements will be discussed with the DTSC and appropriate actions taken. The DTSC will review detailed implementation plans for IRMs, if needed, prior to performance of the work.

At this time, the only additional IRM that may be required would be to stabilize small areas of uncovered insulation materials, containing asbestos, within the AIRCO CO_2 processing unit.

5.4 SAMPLE ANALYSIS AND DATA VALIDATION

Prior to initiation of field activities, a State-certified laboratory will be selected to conduct analytical testing. The laboratory will provide a copy of their QA/QC manual to the HLA project manager. This manual will be reviewed by the HLA Quality Assurance Officer (QAO) prior to contracting with the laboratory. If necessary, an audit of the laboratory will be conducted.

Sample types to be collected during field activities include air, soil, groundwater, and surface water samples. Sample tracking analysis and validation criteria are discussed in the QAPP (Appendix C).

5.5 DATA EVALUATION

A large amount of data will be collected during the RI. During these investigations, data will be filed and stored in both project files and in a computer database. The Data Management Plan for the RI is presented in Appendix B. This plan discusses data filing, storage, security, file access, and final data transfer at the close of the project. Both physical project files and the computer database system are discussed in the Data Management Plan.

Data collected during the RI will be tabulated, reduced, and analyzed. The locations of all borings and wells will be shown on the topographic site map. Boring and well logs will be edited, drafted, and used to construct geologic cross sections through the site. This information will be used to develop a conceptual model of subsurface geology at the site.

Chemical data will be tabulated and plates depicting the distribution of chemicals in soil and groundwater will be prepared. Data will be quantified using statistical methods. Information will be used to estimate the configuration and volume of chemical-impacted soil for the baseline risk assessment and feasibility study.

Information will be used to refine the preliminary conceptual model of the site, to better identify potential chemical release pathways, and receptors, and to expedite the detailed screening and analysis of potential remedial alternatives.

5.6 BASELINE RISK ASSESSMENT

The following discussion presents a Public Health and Environmental Evaluation Plan to describe the baseline risk assessment that will be performed for the Lakewood and Railroad Sections at the Site. Based on this baseline risk assessment, a quantitative evaluation of potential public health risks associated with the Site, in the absence of remediation, can be made. The baseline risk assessment will provide the basis for determining whether or not remedial action is necessary and the justification for performing remedial actions.

HLA's approach to the baseline risk assessment is to make full use of existing site data, as well as data collected during the planned field investigation. All calculations, assumptions, and methodologies used in the risk assessment process will be outlined in detail and will be consistent with DTSC methodologies (DHS, 1986) and with EPA methodologies for risk assessment (EPA, 1986, 1988, 1989a, 1989b, 1989c, 1989d).

HLA will prepare a risk assessment that will evaluate the potential pathways of exposure and quantitatively characterize potential risks associated with these exposures. The scope of work will consist of the tasks described below.

5.6.1 Review of Relevant Site Data

Prior to initiating the baseline risk assessment, HLA's staff will gather, organize, and review available site data. These data will include information on site background, site history, site characterization, and site-specific data necessary for exposure assessment (i.e., locations of sensitive receptors such as schools or parks).

Available site data also will be reviewed to identify biological resources located in proximity to the site (e.g., sensitive species and/or species of concern). From this review, a qualitative discussion of environmental impact will be made.

5.6.2 Selection of Chemicals of Concern

HLA will focus the baseline risk assessment on chemicals of highest concern at the site. In selecting these chemicals of concern (COCs), HLA will evaluate the chemicals detected in various media during the RI at the site, the concentrations and frequencies of detection, chemical toxicity information, and chemical and physical parameters related to environmental mobility and persistence. COC selection will be in accordance with procedures outlined in the Superfund Public Health Evaluation Manual (EPA, 1986) and Risk Assessment Guidance for Superfund (EPA, 1989d), and the DHS draft Scientific and Technical Standards for Hazardous Waste Sites (1990).

5.6.3 Fate and Transport of Indicator Chemicals

In the baseline risk assessment, HLA will briefly discuss the potential fate and transport of each COC. The physical and chemical characteristics of the chemicals as defined in standard references will be used to characterize the environmental persistence of each chemical and its propensity to migrate in various media and transfer from one medium to another. Specifically, HLA will evaluate the persistence and mobility of the COCs under conditions prevailing at the site. This evaluation may include a discussion of the tendency of these chemicals to be sorbed to soils, their tendency to leach into groundwater, the potential for chemical transport between aquifers, their potential transport and fate in surface water in the site vicinity, and their potential to volatilize into the air in the site vicinity.

5.6.4 Identification of Exposure Pathways and Receptor Populations: Comparison to Applicable or Relevant and Appropriate Requirements

HLA will identify the principal pathways through which exposure could occur both onsite and offsite. A summary of the population distribution and the potential for exposure of sensitive populations (e.g., children, elderly persons) will also be discussed. Concentrations of COCs will be estimated at selected exposure points where human populations may be exposed. HLA will consider potential inhalation, ingestion, and dermal exposure routes; however, only health risks associated with the primary routes of exposure to COCs will be quantified.

The primary exposure routes will be evaluated in detailed exposure scenarios that outline the duration of exposure, route of transport, and potential receptor locations. For each exposure scenario, HLA will use either the concentrations in the media that have been detected in the field investigations or exposure point concentration obtained from the fate and transport modeling.

HLA then will compare projected or actual concentrations of COCs at the exposure points to applicable or relevant and appropriate requirements (ARARs) and other Federal and State criteria, advisories, and guidance. Currently, the EPA considers Maximum Contaminant Levels (MCLs) developed under the Safe Drinking Water Act, Federal Ambient Water Quality Criteria (AWQC), National Ambient Air Quality Standards (NAAQs), and State environmental standards to be potential ARARs for use at Superfund sites. HLA also will consider Maximum Contaminant Level Goals (MCLGs) developed under the Safe Drinking Water Act (EPA, 1986a).

5.6.5 Exposure Assessment

HLA will assess the degree of potential human exposure to the COCs. Chemical intakes (subchronic and chronic) will be calculated for exposures, and the assumptions used (e.g., inhalation rates, absorption factors) will be documented in the baseline risk assessment report. The assumptions selected will represent a typical exposure case and a reasonable maximum exposure case for each of the scenarios described in the previous section, with the exception of dermal exposure. For dermal exposures, the EPA currently recommends assessing typical exposures only.

5.6.6 Toxicity Assessment

HLA will prepare a brief toxicological profile for each COC following a review of recently published information on the toxicity and health effects. For carcinogenic chemicals, HLA's toxicity profiles will refer to updated evaluations by the EPA's Carcinogen Assessment Group, as necessary.

Included in the toxicity assessment will be the ARARs and health and environmental criteria for each COC. These include ambient water quality criteria standards, ambient air standards, DTSC-applied action levels (AALs), MCLs, risk reference doses, and carcinogenic potency factors.

5.6.7 Risk Characterization

For noncarcinogenic chemicals, HLA will compare exposure data to established "no-observed-adverse-effect-levels" (NOAELs), or to the EPA-established reference doses (RFDs). For carcinogens, HLA will compare exposure data to estimates of unit risk, which have been calculated by the EPA using the linearized, multistage dose-response model (EPA, 1986; 1989a). If available, DTSC-derived AALs will be used to compare exposure data to acceptable chemical intake levels. HLA will consider a potential unacceptable risk to be present if, for any identifiable population group, the calculated population risks are greater than levels generally regarded as of concern, or the margins of safety are less than those usually considered adequate (DHS, 1986; EPA, 1989d).

HLA will consider the effects of exposure to each COC under the evaluated scenarios. However, because these chemicals occur together, the potential adverse effects that the chemical mixtures may have in humans will be evaluated. HLA will sum the excess cancer risks or calculate the hazard indices (noncarcinogenic risks) for chemical mixtures (DHS, 1986; EPA, 1989c). Synergistic or antagonistic chemical interactions will be discussed if adequate data are available for such a discussion.

A discussion of the uncertainties in the estimates and assumptions used throughout the baseline risk assessment also will be included in the baseline risk assessment report.

5.7 TREATABILITY STUDY/PILOT TESTING

Pilot, bench, and treatability studies will be conducted as appropriate during the RI/FS to help evaluate certain remedial options. Technologies requiring such studies could include vapor extraction; biological, chemical, and physical treatment; neutralization; surfactant-assisted flushing; thermal destruction; fixation; and groundwater pumping.

Prior to initiation of any of the above studies, a workplan will be prepared and submitted to the DTSC for review and approval. The workplan will describe the purpose of the test(s) and will discuss the test facilities and necessary equipment. Information on equipment procurement, test construction, and test equipment operation also will be presented.

Workplan preparation also will include preparation of procedures describing all test activities. These procedures will be added to the PPM.

5.8 REMEDIAL INVESTIGATION REPORT

The RI report will present and discuss data generated during the site investigations in both the Lakewood and Railroad sections. This report will include, but is not limited to, the following sections:

- Introduction (overview of the report, site background information, and RI summary),

- Site Features Investigation (demography, land use, biota, natural resources, meteorology, and surface water),
- Hydrogeologic Investigation (soils, geology, groundwater),
- Surface Water Investigation (surface water, drainage),
- Hazardous Substance Investigation (released waste types, characteristics),
- Baseline Risk Assessment, and
- Appendices containing all field and laboratory data.

The draft report will be submitted to the DTSC for review and comment. After the DTSC has reviewed the report, a meeting with the DTSC, Texaco, and HLA will be held to discuss the DTSC comments and necessary revisions. The report then will be revised and resubmitted to the DTSC for final approval.

FEASIBILITY STUDY

5.9 REMEDIAL ALTERNATIVES DEVELOPMENT/SCREENING

The first step in the FS process involves developing remedial action objectives for protecting human health and the environment that specify contaminants and media of concern, potential exposure pathways, and preliminary remediation goals. The preliminary remediation goals are concentrations of contaminants for each exposure route that are believed to provide adequate protection of human health and the environment based on preliminary site information. These goals are also used to assist in setting parameters for the purpose of evaluating technologies and developing remedial alternatives. Because these preliminary remediation goals typically are formulated prior to completion of a baseline risk assessment, they are initially based on applicable or relevant and appropriate requirements (ARARs). The ARARs will be identified to address hazardous substances, pollutants, contaminants, remedial action, location, or other circumstances found at the site in accordance with 40 CFR 300.400(g). If ARARs are not available, EPA toxicity information such as reference doses or cancer risk factors for carcinogens will be considered in accordance with 40 CFR 300.430(e).

Preliminary remediation goals will be modified, as necessary, as more information becomes available during the RI/FS. The remedy will be selected when final remediation goals are determined. Baseline risk assessments will be used to evaluate exposure for systemic toxicants and for known or suspected carcinogens. Acceptable exposure levels for these risk assessments will be based on concentration levels that represent an excess upper-bound lifetime cancer risk to an individual of between one in one thousand (10^{-4}) and one in one million (10^{-6}) using information on the relationship between dose and response. The 10^{-6} risk level will be used as the point of departure for determining remediation goals for alternatives when ARARs are not available. The ultimate decision on the appropriate level of protection depends on the selected remedy, which is based on the nine criteria listed in 40 CFR 300.430(e)(9)(iii) and presented herein in Section 5.11.

If the RI results indicate that remediation of soil is required for this site, the remedial actions that would be selected for screening could include one or more of the following:

Remedial Action	Description
No Action	Periodic monitoring and analysis of soil, vapor, and water samples (baseline comparison)
Containment	Surface covers, hydrologic isolation
Removal	Disposal at an approved landfill
Extraction	Vapor venting
Onsite Treatment	Biological, chemical, or physical treatment (aboveground)
Offsite Treatment	Approved waste treatment facility
In-Situ Treatment	Biodegradation; air/steam-stripping; neutralization; surfactant-assisted flushing; chemical fixation

The FS will be modified, if necessary, to address groundwater contamination if the RI does not confirm that the elevated concentrations of chemicals in groundwater are solely from an offsite source.

5.9.1 Applicable Technologies

The applicable technologies associated with the above remedial actions for soil include the following:

1. Potential Remedial Alternatives for Contaminated Soils Containment

    a. Construct clay cover or concrete cap over surface of soil, and

    b. Monitor groundwater and subsurface vapors periodically following completion of remedial action.

2. Excavation and Treatment (onsite or offsite) or Disposal

    a. Excavate contaminated soil,

    b. Monitor air quality during excavation,

    c. Control vapor emissions during excavation,

    d. Treat soils onsite, if feasible, and use as backfill, or place excavated soil in lined and covered trucks, transport soil to an approved disposal site, and backfill excavation with clean, imported fill, and

    e. Monitor groundwater and subsurface vapors periodically after soil is removed.

3. Vapor Venting (for volatile organics)

    a. Install vapor-recovery and possibly air injection wells in and around the contaminated soil zone above the water table,

    b. Cover ground surface to prevent vapors from escaping vertically,

    c. Install vacuum pump on recovery well(s),

    d. Extract organic vapors from recovery well(s), and provide treatment in a treatment unit, such as activated carbon, or a thermal/catalytic oxidizer,

    e. Reinject clean air into ground through injection well(s), if needed, and

    f. Monitor subsurface vapors during the remedial action to confirm its effectiveness.

4. In-Situ Air/Steam-Stripping (for volatile organics)

   a. Use special auger drilling equipment and heated air/steam-drive methods to force soil vapors to migrate upward through soil to the ground surface,

   b. Collect vapors within steam shroud over working area,

   c. Pass vapors through treatment unit, such as activated carbon,

   d. Treat steam condensate in a bioreactor or with liquid-phase activated carbon, and

   e. Monitor subsurface vapors during remediation to confirm that soil treatment is complete.

5. In-Situ Biodegradation Bioventing (for nonchlorinated hydrocarbons)

   a. Install air inlet injection wells within the contaminated area,

   b. Construct air extraction wells around the contaminated area,

   c. Extract air from extraction wells,

   d. Treat extracted air, if needed,

   e. Add nutrients, and microorganisms to treated air stream and reintroduce treated air into the ground,

   f. Monitor extracted air (CO_2 and methane) to evaluate performance of biodegradation process, and

   g. Install soil boring(s) to confirm that treatment is complete.

6. In-Situ Neutralization (for metals)

   a. Construct injection wells or infiltration gallery in the contamination area,

   b. Add neutralizing agents,

   c. Alternatively, excavate soil and neutralize in above ground containers,

   d. Excavate and dispose of neutralized soil if not allowed to remain in place, and

   e. Monitor groundwater pH periodically to confirm that soil treatment is complete.

7. In-Situ Fixation (for metals, asbestos, PCBs)

   a. Excavate soil and mix with fixative chemicals,

b. After mixing, return stabilized soil to ground,

c. Periodically monitor groundwater and subsurface vapors after soil fixation is complete.

Combinations of the above techniques will also be considered for each of the above treatment methods, and conformation borings would be required to verify mitigation.

8. Dechlorination and Thermal Oxidation (PCBs, heavy hydrocarbons)

a. Excavate soil,

b. Treat soil with dechlorination additives,

c. Pass soil through a low temperature (800°F) kiln, and

d. Backfill or dispose of soil.

5.9.2 Screening Criteria

Prior to preliminary screening, a set of remedial action objectives for each site area of interest will be established. These objectives will include setting standards for the protection of human health and establishing preliminary cleanup levels as discussed above. Estimates of the volume of each site area requiring remediation also will be made.

Preliminary screening criteria will be developed according to EPA guidelines (EPA, 1988) and 40CFR300.430(e)(7), to evaluate alternative remedial action technologies. These criteria are as follows:

- Effectiveness - The effectiveness of specific remedial technologies will be evaluated focussing on:
  - The potential effectiveness of process options in handling the estimated areas or volumes of media and meeting the remediation goals identified in the remedial action objectives,
  - The potential impacts to human health and the environment during the construction and implementation phase, and
  - How proven and reliable the process is with respect to the contaminants and conditions at the Site.

- Implementability - Implementability includes both the technical and administrative feasibility of implementing a technology process.

- Cost - Cost will play only a limited role in the screening of process options, and only relative capital and operation-and-maintenance costs will be estimated.

5.9.3 Selection of Alternatives

Screening criteria mentioned above will be used to assess the feasibility of each of the proposed remedial actions. After screening, remedial actions assessed as infeasible will be deleted from the list. At least two remedial alternatives, in addition to the no action alternative will be selected for detailed analysis for each of the types of contaminants detected at the Site.

The results of the remedial screening activities will be presented to the DTSC in a technical memorandum describing the screening criteria, ranking system, and rationale for excluding or including remedial actions for detailed analysis. A review meeting will be conducted with the DTSC, Texaco, and HLA to discuss the preliminary screening process and to obtain DTSC concurrence with remedial actions selected for detailed analysis.

5.10 DETAILED ANALYSIS OF ALTERNATIVES

Detailed analysis of selected alternatives for remediation will include the analysis and presentation of all data necessary to select remedial actions for the site. During this task, each alternative will be ranked against evaluation criteria and will be compared to other alternatives. Key tradeoffs for implementing each alternative will be presented.

Regulatory requirements will be a major consideration in the detailed analysis. These regulations will include the following:

- CERCLA compliance,
- RWQCB/EPA Groundwater Protection System (GWPS) compliance,
- DTSC/RCRA compliance,
- SCAQMD,

- California Department of Occupational Safety and Health Administration (CAL-OSHA) compliance, and
- Los Angeles County compliance.

Evaluation of alternatives will be based on the following nine criteria as required by 40 CFR 300.430(e)(9)(iii):

- Overall protection of human health and the environment,
- Compliance with ARARs,
- Long-term effectiveness and performance,
- Reduction of toxicity, mobility, or volume through treatment,
- Short-term effectiveness,
- Implementability,
- Cost,
- State acceptance, and
- Community acceptance.

These criteria are categorized into three groups:

1. Threshold Criteria (compliance with ARARs),
2. Primary Balancing Criteria (long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; and cost, and
3. Modifying Criteria (State and community acceptance).

5.10.1 Comparison of Alternatives

A method of ranking alternative remedial actions will be developed based on the criteria listed above. The ranking will provide a weighting factor for each criteria, and the ranking criteria will be submitted prior to evaluation of the alternatives. The results of the alternative remedial actions evaluation will be used to identify feasible and cost-effective methods of remediating the site.

5.10.2 Recommendations

A discussion of each alternative's advantages, limitations, and cost, a comparative analysis of alternatives, and selected alternative(s) will be presented in the FS report along with recommendations for the optimum alternative for each site area. It may be necessary to use one or more remediation methods in combination.

5.11 FEASIBILITY STUDY REPORT

An FS Report will be prepared following completion of the alternatives evaluation. The FS Report will include, but will not be limited to, the following sections:

- Executive Summary,
- Introduction (site background information, nature and extent of problems, objectives of remedial actions),
- Identification and Screening of Remedial Action Technologies (remedial action objectives, general response actions, technical criteria, remedial action alternatives developed, environmental and public health criteria, other screening criteria, cost criteria),
- Remedial Action Alternatives (description and evaluation of each),
- Analysis of Remedial Action Alternatives (non-cost criteria analysis, and cost analysis),
- Summary of Alternatives,
- Comparative Analysis of Alternatives, and Recommendations.
- Recommendation of Cost-Effective Alternative(s), and
- Conceptual Design of Selected Alternative(s).

The draft report will be submitted to the DTSC for review and comment. After the DTSC has reviewed the report, a meeting with the DTSC, Texaco, and HLA may be held to discuss the DTSC comments and necessary revisions. The report will then be revised and resubmitted to the DTSC for final approval.

6.0 SCHEDULE

The proposed RI/FS schedule is presented on Plate 12. The schedule presents the key tasks, including the sequence and the expected duration. Project milestones and major deliverables also are identified.

For scheduling purposes, DTSC review time for initial report submittals has been assumed to be 1 month for each review. Two weeks have been assumed for each DTSC review of revised submittals.

7.0 PROJECT MANAGEMENT

Effective project management and project coordination will be critical to accomplish the RI/FS in an efficient manner. Project management will include providing supervision for the planning, design, and implementation of RI/FS tasks; ensuring that tasks are completed on schedule and in accordance with procedures specified in the workplan; and interfacing with DTSC personnel on a continuing basis.

The Project Management Plan presented in Appendix A describes the project organization, project team and responsibilities, and reporting requirements anticipated during the RI/FS activities.

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TABLES

Table 1. Summary of Hazardous/Non-Hazardous Materials Stored or Used at the Site

Hazardous/Non-Hazardous Material	Location
Waste Oil	Lakewood Section
Diesel	Lakewood Section
Gasoline	Lakewood Section
Waste Water	Lakewood Section
Jet Fuel (JP-5)	Lakewood/Railroad/Powerine Area
Fuel Oil	Lakewood/Railroad/Powerine Area
Gas Oil	Lakewood/Railroad/Powerine Area
Butane/LPG	Lakewood/Railroad/Powerine Area
Asbestos	Railroad Section
Crude Oil	Lakewood Section/Powerine Area
Drilling Muds	Lakewood Section/Powerine Area

Note:

LPG = Liquified Petroleum Gas

Table 2. Summary of Hazardous/Materials Storage/Transfer Units at the Site

Type of Storage/Transfer Unit	Location	Approximate Capacity	Known or Suspected Contents	Status
AGSTs (3)	Lakewood Section	30,000 gallons	Waste Oil	Present
UST (1)	Lakewood Section	2,500 gallons	Waste Water/Oil	Present
AGSTs (≈30)	Lakewood Section	10,000(?)-40,000(?) gallons	Crude Oil	Removed
AGST (1)	Lakewood Section	12,010 gallons	Diesel	Removed
UST (1)	Lakewood Section	4,000 gallons	Diesel/Gasoline	Removed
UST (1)	Lakewood Section	6,000 gallons	Diesel/Gasoline	Removed
UST (1)	Lakewood Section	3,000 gallons	Diesel	Removed
UST (1)	Lakewood Section	10,000 gallons	Gasoline	Removed
UST (1)	Lakewood Section	12,000 gallons	Waste Oil	Removed
Pipelines (3)	Lakewood Section/Railroad Section/Powerine Area	2,400 linear feet of 2-inch, 4-inch, and 8-inch diameter pipe	Jet Fuel, Gas Oil, Fuel Oil, Butane/LPG	Removed
AGST (2)	Powerine Area	80,000 gallons	Jet Fuel, Gas Oil, Fuel Oil, Crude Oil	Removed
Sumps	Lakewood Section/Railroad Section	Unknown	Drilling Muds	Removed
Loading Rack	Railroad Section	Unknown	Fuel Oil, Butane/LPG	Removed

Notes:

References: TRC, 1990; Powerine, 1992a

AGST = Aboveground Storage Tank
UST = Underground Storage Tank
LPG = Liquified Petroleum Gas

92TEX024.tbl

Table 3
Summary of Soil Analytical Results - PCBs
Walker Property Site

Location ID	Depth (feet)	Date Collected	Consultant	PCB 1016 8080	PCB 1221 8080	PCB 1232 8080	PCB 1242 8080	PCB 1248 8080	PCB 1254 8080	PCB 1260 8080
3	11-13.5	4/01/85	D&M				(0.08)	(0.08)	(0.08)	(0.08)
4	1.5-8.5	4/01/85	D&M				(0.08)	(0.08)	(0.08)	(0.08)
5A	3.5-6	4/01/85	D&M				(0.08)	(0.08)	(0.08)	(0.08)
5B	3.5	4/01/85	D&M				(0.08)	(0.08)	(0.08)	(0.08)
6	6-13.5	4/01/85	D&M				(0.08)	(0.08)	(0.08)	(0.08)
7A	4.5-9.5	4/01/85	D&M				(0.08)	(0.08)	(0.08)	(0.08)
7B	2-3.5	4/01/85	D&M				(0.08)	94	(0.08)	(0.08)
8	20.5-25	4/01/85	D&M				(0.08)	(0.08)	(0.08)	(0.08)
UST 1	8	9/01/86	D&M				(0.08)	29		
UST 2	8	9/01/86	D&M				58	(0.08)		
UST 3	3	9/01/86	D&M				248	(0.08)		
UST 4	5	9/01/86	D&M				1	(0.08)		
B1	1	10/01/86	D&M				200	(0.08)		(0.08)
B2	3.5	10/01/86	D&M				0.27	(0.08)		(0.08)
C3	1	10/01/86	D&M				(0.08)	(0.08)		(0.08)
E5	7	10/01/86	D&M				(0.08)	3.4		(0.08)
H10	2	10/01/86	D&M				3.1	(0.08)		3.3
H11	4	10/01/86	D&M				(0.08)	(0.08)		(0.08)
I12	4	10/01/86	D&M				4.3	(0.08)		(0.08)
J13	1	10/01/86	D&M				2.3	(0.08)		(0.08)
K14	1	10/01/86	D&M				30	(0.08)		(0.08)
L16	5	10/01/86	D&M				13	(0.08)		(0.08)
M17	6	10/01/86	D&M				15	(0.08)		(0.08)
P18	1	10/01/86	D&M				1.7	(0.08)		1.8
P19	4	10/01/86	D&M				(0.08)	(0.08)		(0.08)
Stockpile 20		10/01/86	D&M				(0.08)	10		(0.08)
Stockpile 21		10/01/86	D&M				(0.08)	11		(0.08)
TW-1	5	10/01/89	TRC	(20)	(20)	(20)	240	(20)	(20)	(20)
TW-1	10	10/01/89	TRC	(10)	(10)	(10)	140	(10)	(10)	(10)
TW-1	15	10/01/89	TRC	(5)	(5)	(5)	120	(5)	(5)	(5)
TW-2	5	10/01/89	TRC	(.01)	0.09	(.01)	(.01)	(.01)	(.01)	(.01)
TW-2B	5	10/01/89	TRC	(.5)	43	(.5)	(.5)	(.5)	(.5)	2.7

() Indicates compound not detected at or above enclosed reporting limit.
All results reported in milligrams per kilograms.

Table 3
Summary of Soil Analytical Results - PCBs
Walker Property Site

Location ID	Depth (feet)	Date Collected	Consultant	PCB 1016 8080	PCB 1221 8080	PCB 1232 8080	PCB 1242 8080	PCB 1248 8080	PCB 1254 8080	PCB 1260 8080
TW-2B	10	10/01/89	TRC	(.01)	(.01)	(.01)	0.014	(.01)	(.01)	(.01)
TW-3	3	10/01/89	TRC	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)
TW-3	8	10/01/89	TRC	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
TW-4	3	10/01/89	TRC	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)
TW-4B	5	10/01/89	TRC	(10)	140	(10)	(10)	(10)	(10)	(10)
TW-4B	7	10/01/89	TRC	(.03)	0.5	(.03)	(.03)	(.03)	(.03)	(.03)
TW-4B	15	10/01/89	TRC	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
TW-5	5	10/01/89	TRC	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)
TW-9	4-8	10/01/89	TRC	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)
TW-10	3	10/01/89	TRC	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)
TW-10	8	10/01/89	TRC	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)
TW-11	3	10/01/89	TRC	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
TW-12	3	10/01/89	TRC	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)
TW-13	3	10/01/89	TRC	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)
TW-16B	5	10/01/89	TRC	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)
TW-17	5	10/01/89	TRC	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)
TW-20B	5	10/01/89	TRC	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)
TW-B1	5	10/01/89	TRC	(.2)	(.2)	(.2)	15	(.2)	(.2)	(.2)
TW-B1	10	10/01/89	TRC	(.5)	(.5)	(.5)	6.1	(.5)	(.5)	(.5)
TW-B1	15	10/01/89	TRC	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
TW-B1	25	10/01/89	TRC	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)
TW-B1	50	10/01/89	TRC	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)
TW-B2	5	10/01/89	TRC	(.1)	8	(.1)	(.1)	(.1)	(.1)	(.1)
TW-B2	10	10/01/89	TRC	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)
TW-B2	15	10/01/89	TRC	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)

() Indicates compound not detected at or above enclosed reporting limit.
All results reported in milligrams per kilograms.

Table 4
Summary of Soil Analytical Results - Metals
Walker Property Site

Location ID	Depth (feet)	Date Collected	Consultant	Barium CAM	Lead CAM
1	25-40	4/01/85	D&M	42	(5)
2	25-30	4/01/85	D&M	36	(5)
3	11-13.5	4/01/85	D&M	47	(5)
4	1.5-8.5	4/01/85	D&M	163	5.1
5A	3.5-6	4/01/85	D&M	760	30
5B	3.5	4/01/85	D&M	2520	88
5C	2	3/01/86	D&M	1120	52
5D	2	3/01/86	D&M	615	37
5E	2	3/01/86	D&M	473	17
5E	5	3/01/86	D&M	49	(5)
5G	2	3/01/86	D&M	248	93
5H	1	3/01/86	D&M	526	98
6	6-13.5	4/01/85	D&M	96	6.5
7A	4.5-9.5	4/01/85	D&M	221	(5)
7B	2-3.5	4/01/85	D&M	572	1450
8	20.5-25	4/01/85	D&M	36	(5)
B1	1	10/01/86	D&M	127	9.1
B2	3.5	10/01/86	D&M	216	15
C3	1	10/01/86	D&M	118	7.6
E5	7	10/01/86	D&M	127	8.1
H10	2	10/01/86	D&M	256	438
H11	4	10/01/86	D&M	164	10
I12	4	10/01/86	D&M	164	220
J13	1	10/01/86	D&M	178	12
K14	1	10/01/86	D&M	1260	2470
L16	5	10/01/86	D&M	158	17
M17	6	10/01/86	D&M	126	276
P18	1	10/01/86	D&M	760	450
P19	4	10/01/86	D&M	131	15
Stockpile 20		10/01/86	D&M	68	(5)
Stockpile 21		10/01/86	D&M	180	(5)
Surface 23	1	10/01/86	D&M	88	120
B-1	1	7/01/88	EMCON	137	12.6
B-2	5	7/01/88	EMCON	169	14.5
B-3	5	7/01/88	EMCON	123	12.5
B-4	5	7/01/88	EMCON	120	11.5
B-5	5	7/01/88	EMCON	91.3	13.8
B-6	5	7/01/88	EMCON	96.7	17.9
B-7	5	7/01/88	EMCON	108	12
B-8	5	7/01/88	EMCON	63.9	9.5
B-9	5	7/01/88	EMCON	47.1	8.9
B-10	5	7/01/88	EMCON	640	84.9
B-11	5	7/01/88	EMCON	321	32
B-12	5	7/01/88	EMCON	107	10.4
B-13	5	7/01/88	EMCON	126	16.6
B-14	5	9/01/88	EMCON	208	6.2
B-15	5	9/01/88	EMCON	118	2.2

() Indicates compound not detected at or above enclosed reporting limit.
All results reported in milligrams per kilograms.

Table 4
Summary of Soil Analytical Results - Metals
Walker Property Site

Location ID	Depth (feet)	Date Collected	Consultant	Barium CAM	Lead CAM
B-16	5	9/01/88	EMCON	293	11.2
UST 1	8	9/01/86	D&M	190	130
UST 2	8	9/01/86	D&M	150	54
UST 3	3	9/01/86	D&M	260	1100
UST 4	5	9/01/86	D&M	190	74
Surface 24	1	10/01/86	D&M	84	21

() Indicates compound not detected at or above enclosed reporting limit.
All results reported in milligrams per kilograms.

Table 5
Summary of Soil Analytical Results - Chlorinated Hydrocarbons
Walker Property Site

Location ID	Depth (feet)	Date Collected	Consultant	1,1,1-Tri-chloro-ethane 8010	1,1-Di-chloro-ethane 8010	Tetra-chloro-ethene 8010	Tri-chloro-ethane 8010
1	25-40	4/01/85	D&M	(0.05)	(0.05)	(0.05)	(0.05)
2	25-30	4/01/85	D&M	(0.05)	(0.05)	(0.05)	(0.05)
3	11-13.5	4/01/85	D&M	(0.05)	(0.05)	(0.05)	(0.05)
4	1.5-8.5	4/01/85	D&M	(0.05)	(0.05)	(0.05)	(0.05)
5A	3.5-6	4/01/85	D&M	(0.05)	(0.05)	(0.05)	(0.05)
5B	2.5-4.0	4/01/85	D&M	0.07	(0.05)	0.11	0.25
6	6-13.5	4/01/85	D&M	(0.05)	(0.05)	(0.05)	(0.05)
7A	4.5-9.5	4/01/85	D&M	(0.05)	(0.05)	(0.05)	(0.05)
7B	2-3.5	4/01/85	D&M	9.7	4.4	12	32
8	20.5-25	4/01/85	D&M	(0.05)	(0.05)	(0.05)	(0.05)

() Indicates compound not detected at or above enclosed reporting limit.
All results reported in milligrams per kilograms.

Table 6

Summary of Soil Analytical Results - Volatile and Semivolatile Aromatics

Walker Property Site

Location ID	Depth (feet)	Date Collected	Consultant	Anthracene 8310	Benzo(a)-pyrene 8310	Fluor-anthra-cene 8310	Fluorene 8310	Napthalene 8310	Phen-anthrene 8310	Pyrene 8310
1	25-40	4/01/85	D&M							
2	25-30	4/01/85	D&M							
3	11-13.5	4/01/85	D&M							
4	1.5-8.5	4/01/85	D&M							
5A	3.5-6	4/01/85	D&M							
5B	3.5	4/01/85	D&M							
6	6-13.5	4/01/85	D&M							
7A	4.5-9.5	4/01/85	D&M							
7B	2-3.5	4/01/85	D&M							
8	20.5-25	4/01/85	D&M							
C3	1	10/01/86	D&M	(0.004)	(0.010)	(0.010)	(0.020)	(0.1)	0.035	(0.020)
E-1	10	12/01/88	EMCON							
E-1	30	12/01/88	EMCON							
E-1	70	12/01/88	EMCON							
E-1	80	12/01/88	EMCON							
E-1	90	12/01/88	EMCON							
E-1	95	12/01/88	EMCON							
E-2	10	12/01/88	EMCON							
E-2	20	12/01/88	EMCON							
E-2	30	12/01/88	EMCON							
E-2	40	12/01/88	EMCON							
E-2	50	12/01/88	EMCON							
E-3	10	12/01/88	EMCON							
E-3	20	12/01/88	EMCON							
E-3	30	12/01/88	EMCON							
E-3	40	12/01/88	EMCON							
E-4	10	12/01/88	EMCON							
E-4	20	12/01/88	EMCON							
E-4	30	12/01/88	EMCON							
E-4	40	12/01/88	EMCON							
Excavation 3	1.5-2	10/01/89	TRC							
Excavation 9	6	10/01/89	TRC							

() Indicates compound not detected at or above enclosed reporting limit.
All results reported in milligrams per kilograms.

Table 6

Summary of Soil Analytical Results - Volatile and Semivolatile Aromatics

Walker Property Site

Location ID	Depth (feet)	Date Collected	Consultant	Anthracene 8310	Benzo(a)-pyrene 8310	Fluor-anthra-cene 8310	Fluorene 8310	Napthalene 8310	Phen-anthrene 8310	Pyrene 8310
Excavation 11	7	10/01/89	TRC							
FB-1	10	2/06/90	TRC							
FB-1	40	2/06/90	TRC							
FB-2	40	2/06/90	TRC							
FB-3	20	2/06/90	TRC							
FB-4	20	2/06/90	TRC							
FB-5	20	2/06/90	TRC							
JB-1	20	1/01/90	TRC							
JB-1	101-103	1/01/90	TRC							
JB-1	107.5	1/01/90	TRC							
JB-2	30	1/01/90	TRC							
JB-2	70	1/01/90	TRC							
JB-2	103-105	1/01/90	TRC							
JB-3	20	1/01/90	TRC							
JB-3	40	1/01/90	TRC							
JB-3	90	1/01/90	TRC							
JB-3	100.5	1/01/90	TRC							
JB-4	70	1/01/90	TRC							
JB-4	90	1/01/90	TRC							
JB-5	30	1/01/90	TRC							
JB-5	40	1/01/90	TRC							
JB-5	90	1/01/90	TRC							
JB-5	101	1/01/90	TRC							
JB-6	30	1/01/90	TRC							
JB-6	70	1/01/90	TRC							
JB-6	100	1/01/90	TRC							
JB-7	40	1/01/90	TRC							
JB-7	90	1/01/90	TRC							
JB-7	102.5	1/01/90	TRC							
JB-8	20	1/01/90	TRC							
JB-8	70	1/01/90	TRC							
JB-8	90	1/01/90	TRC							

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All results reported in milligrams per kilograms.

Table 6
Summary of Soil Analytical Results - Volatile and Semivolatile Aromatics
Walker Property Site

Location ID	Depth (feet)	Date Collected	Consultant	Anthracene 8310	Benzo(a)-pyrene 8310	Fluor-anthra-cene 8310	Fluorene 8310	Napthalene 8310	Phen-anthrene 8310	Pyrene 8310
JB-8	100.5	1/01/90	TRC							
JB-9	10	1/01/90	TRC							
JB-9	100	1/01/90	TRC							
JB-9	105	1/01/90	TRC							
JB-10	30	1/01/90	TRC							
JB-10	70	1/01/90	TRC							
JB-10	106-107	1/01/90	TRC							
L14	5	10/01/86	D&M	0.24	0.53	1.2	1.4	2.2		1.5
JB-9	50	1/01/90	TRC							
JB-9	70	1/01/90	TRC							
PT-1	1	1/01/90	TRC							
PT-2	13	1/01/90	TRC							
PT-3	10	1/01/90	TRC							
PT-4	10	1/01/90	TRC							
PT-5	12	1/01/90	TRC							
PT-6	12	1/01/90	TRC							
TMB-1	20	10/01/89	TRC							
PT-13	13	1/01/90	TRC							
TMB-2	15	10/01/89	TRC							
TMB-2	25	10/01/89	TRC							
TMB-3	10	10/01/89	TRC							
TMB-3	30	10/01/89	TRC							
TMB-4	10	10/01/89	TRC							
TMB-5	10	10/01/89	TRC							
TMB-5	20	10/01/89	TRC							
TMB-6	10	10/01/89	TRC							
TMB-6	15	10/01/89	TRC							
TMB-7	10	10/01/98	TRC							
TMB-8	10	10/01/89	TRC							
TMB-9	10	10/01/89	TRC							
TSB-3 (W-1)	20	10/01/89	TRC							
TSB-3 (W-1)	35	10/01/89	TRC							

() Indicates compound not detected at or above enclosed reporting limit.
All results reported in milligrams per kilograms.

Table 6
Summary of Soil Analytical Results - Volatile and Semivolatile Aromatics
Walker Property Site

Location ID	Depth (feet)	Date Collected	Consultant	Anthracene 8310	Benzo(a)-pyrene 8310	Fluor-anthra-cene 8310	Fluorene 8310	Napthalene 8310	Phen-anthrene 8310	Pyrene 8310
TSB-4	30	10/01/89	TRC							
TSB-5 (W-2)	60	10/01/89	TRC							
TSB-6	30	10/01/89	TRC							
TSB-6	10	10/01/89	TRC							
TSB-7 (W-3)	20	10/01/89	TRC							
TSB-7 (W-3)	100	10/01/89	TRC							
TSB-7 (W-3)	110	10/01/89	TRC							
TW-10	13	10/01/89	TRC							
TW-11	3	10/01/89	TRC							
TW-11	7	10/01/89	TRC							
TW-2	15	10/01/89	TRC							
TW-3	18	10/01/89	TRC							
TW-4	5	10/01/89	TRC							
TW-4	15	10/01/89	TRC							
TW-4B	15	10/01/89	TRC							
TW-5	5	10/01/89	TRC							
TW-9	18	10/01/89	TRC							
TW-17	15	10/01/89	TRC							
TW-19	15	10/01/89	TRC							
TW-20B	10	10/01/89	TRC							
TW-B1	25	10/01/89	TRC							
TW-B1	35	10/01/89	TRC							
TW-B2	15	10/01/89	TRC							

() Indicates compound not detected at or above enclosed reporting limit.
All results reported in milligrams per kilograms.

Table 7. Summary of Asbestos Analytical Results

Sample No.	Location	Description	Asbestos Content
TWA-1	Airco CO_2 Processing Shed	Bulk insulation material	40% Chrysolite 25% Anosite
BP-1	Balboa/Pacific Shower Room	Floor Tile	>1%
BP-2	Balboa/Pacific Roof	Roof Material	>1%

Reference: TRC, 1990a

Table 8
Summary of Groundwater Analytical Results.
Walker Property Site

Location ID	Date Collected	Consultant	Benzene 601/602/ 624	Bromo-dichloro-methane 601/602/ 624	1,1-Di-chloro-ethane 601/602/ 624	1,1-Di-chloro-ethene 601/602/ 624	cis-1,2-Dichloro-ethene 601/602/ 624	trans-1,2-Dichloro-ethene 601/602/ 624	Ethyl Benzene 601/602/ 624	Toluene 601/602/ 624	Vinyl Acetate 601/602/ 624	Vinyl Chloride 601/602/ 624	Xylenes 601/602/ 624
EW-1	11/01/89	TRC	730	(5.0)	(5.0)	(5.0)		9.8	1400	16		29	1000
EW-1	3/01/90	TRC	1800	(50.0)	(25.0)	(25.0)		(50.0)	1800	300		(100.0)	620
EW-1	4/01/90	TRC	1300	(50.0)	(25.0)	(25.0)		(50.0)	1600	290		(100.0)	580
EW-1	4/01/90	TRC	460	(3.0)	(4.0)	(6.0)		4.0	1000	65		(6.0)	510
EW-1	4/01/90	TRC	650	(10.0)	(10.0)	(10.0)	11	20	1400	130	(50.0)	(50.0)	720
W-1	11/01/89	TRC	390	(0.5)	3.5	0.6		(0.5)	2.1	3.9		21	6.4
W-1	3/01/90	TRC	140	(10.0)	(5.0)	(5.0)		(10.0)	(5.0)	(5.0)		(20.0)	(20.0)
W-1	4/01/90	TRC	150	(10.0)	(5.0)	(5.0)		(10.0)	12	10		(20.0)	(20.0)
W-1	4/01/90	TRC	140	(5.0)	(5.0)	(5.0)	(25.0)	(5.0)	9.0	12	(10.0)	(5.0)	(5.0)
W-1	4/01/90	TRC	200	(0.3)	1.6	(0.6)		(0.3)	11	4.9		(0.6)	2.7
W-1	4/01/90	TRC	170	(2.0)	(2.0)	(2.0)	(2.0)	(2.0)	7.0	(2.0)	(10.0)	(10.0)	(2.0)
W-2	11/01/89	TRC	78	(0.5)	4.3	(0.5)		(0.5)	6.5	6.5		75	5.0
W-2	3/01/90	TRC	62	(1.0)	(0.5)	(0.5)		(1.0)	(0.5)	(0.5)		(2.0)	(2.0)
W-2	4/01/90	TRC	77	(5.0)	(2.5)	(2.5)		(5.0)	4.0	22		(10.0)	(10.0)
W-2	4/01/90	TRC	83	(1.0)	3.0	(1.0)	5.0	(1.0)	1.5	26	2.7	5.9	(1.0)
W-2	4/01/90	TRC	79	(0.3)	2.5	(0.6)		(0.3)	1.3	16		(0.6)	1.5
W-2	4/01/90	TRC	79	1.0	(1.0)	(1.0)	13	(1.0)	(1.0)	16	(5.0)	(5.0)	(1.0)
W-3	11/01/89	TRC	19	(0.5)	2.5	(0.5)		(0.5)	7.6	2.6		7.1	13
W-3	1/01/90	TRC	(0.5)	(1.0)	1.0	(0.5)		(1.0)	(0.5)	(0.5)		(2.0)	3.3
W-3	3/01/90	TRC	5.3	(1.0)	0.5	(0.5)		(1.0)	(0.5)	4.5		(2.0)	(2.0)
W-3	4/01/90	TRC	3.4	(1.0)	(0.5)	(0.5)		(1.0)	(0.5)	3.4		(2.0)	(2.0)
W-3	4/01/90	TRC	4.2	(1.0)	(1.0)	(1.0)	(5.0)	(1.0)	(1.0)	4.5	(2.0)	(1.0)	(1.0)
W-3	4/01/90	TRC	1.8	(0.3)	(0.4)	(0.6)		(0.3)	(0.2)	0.8		(0.6)	(0.2)
W-4	3/01/90	TRC	120	(10.0)	8.3	(5.0)		(10.0)	19	(5.0)		(20.0)	(20.0)
W-4	3/01/90	TRC	16	(0.5)	1.5	(0.5)	3.2	(0.5)	(0.5)	(0.5)		(0.5)	(0.5)
W-4	4/01/90	TRC	28	(1.0)	1.7	(0.5)		(1.0)	4.8	1.4		4.2	(2.0)
W-4	4/01/90	TRC	31	(1.0)	2.2	(1.0)	(5.0)	(1.0)	1.6	1.0	(2.0)	4.3	(1.0)
W-4	4/01/90	TRC	16	(0.3)	1.4	(0.6)		(0.3)	0.9	1.2		(0.6)	2.2
W-4	4/01/90	TRC	(1.0)	(1.0)	(1.0)	(1.0)	(1.0)	(1.0)	(1.0)	(1.0)	(5.0)	(5.0)	(1.0)
W-4	4/01/90	TRC	(0.5)	(0.5)	1.0	(0.5)	0.81	(0.5)	(0.5)	(0.5)		(0.5)	(0.5)

() Indicates compound not detected at or above enclosed reporting limit.
All results reported in micrograms per liter.

Table 9. Summary of Soil Gas Analytical Results

C_1-C_4 HYDROCARBONS IN SOIL PROBE GAS (ppmv)

Location	C1	C2	C2:	C3	C3:	iso-C4	n-C4
1	2.8	0.2	0.2	0.1	0.1	0.02	0.08
2	5.6	0.4	0.3	0.2	0.1	0.10	0.20
3	6.2	0.5	0.5	0.3	0.4	0.04	0.15
4	2354.0	0.2	0.1	0.2	0.1	0.02	0.04
5	9.4	0.6	0.6	0.2	0.2	0.03	0.05
6	3.1	0.2	0.1	0.1	0.1	-	0.01
7	3.6	0.2	0.1	0.1	0.1	-	0.01
8	3.5	0.1	0.1	0.1	0.1	0.01	0.05
9	4.4	0.4	0.2	0.2	0.1	0.05	0.12
10	2.7	0.1	0.1	0.1	0.1	0.01	0.05
11	10.5	0.2	0.2	0.2	0.1	0.72	0.20
12	13174.0	1.3	0.3	10.4	0.3	208.00	19.90
13	55.5	0.5	0.5	0.3	0.3	1.59	0.30
14	26.6	0.5	0.6	0.3	0.5	0.70	0.25
15	140.0	0.1	-	9.2	0.2	77.30	31.50
16	3.2	0.3	0.3	0.1	0.2	0.07	0.05
17	8.1	0.8	0.7	0.4	0.5	0.05	0.07

Note: Results given in parts per million by volume (milliliters per liter)

Table 9. (continued)

C_1-C_4 HYDROCARBONS IN SOIL PROBE GAS (ppm)

Location	C1	C2	C2:	C3	C3:	iso-C4	n-C4
18	6.4	0.6	0.5	0.2	0.2	0.08	0.11
19	3.2	0.3	0.3	0.2	0.3	0.06	0.09
20	6.5	0.6	0.6	0.3	0.3	0.05	0.12
21	2933.0	0.3	0.2	0.7	0.2	6.65	2.20
22	4.4	0.3	0.3	0.1	0.2	0.04	0.08
23	2.4	0.2	0.2	0.1	0.2	0.03	0.06
24	3.7	0.3	0.4	0.2	0.2	0.05	0.09
25	4.7	0.4	0.6	0.2	0.5	0.05	0.11
26	3.9	0.3	0.3	0.1	0.2	0.03	0.07
27	2.6	0.1	0.1	0.1	0.1	0.02	0.12
28	4.4	0.3	0.4	0.1	0.2	0.03	0.07
29	6.5	0.5	0.5	0.2	0.3	0.04	0.10
30	6.6	0.4	0.2	0.1	0.1	0.08	0.27
31	12.0	1.0	0.8	0.4	0.6	0.06	0.29
32	12.7	0.8	0.7	0.3	0.3	0.10	0.22
33	13.2	1.0	1.0	0.4	0.6	0.08	0.20
34	11.8	1.2	0.9	0.5	0.4	0.08	0.18
35	6.3	0.5	0.4	0.2	0.3	0.05	0.10
36	13.8	0.3	0.3	0.2	0.2	2.92	0.10

Table 9. (continued)

C_1–C_4 HYDROCARBONS IN SOIL PROBE GAS (ppm)

Location	C1	C2	C2:	C3	C3:	iso-C4	n-C4
37	5.1	0.6	0.8	0.2	0.4	0.09	0.12
38	4.8	0.4	0.4	0.2	0.3	0.03	0.08
39	10.8	0.8	0.7	0.3	0.4	0.06	0.29
40	9.1	0.9	0.4	0.3	0.2	0.02	0.05
41	1620.0	1.3	0.5	6.4	0.1	76.80	21.80

Table 9. (continued)

C_1-C_4 HYDROCARBONS IN MONITORING WELL GAS (ppm)

Well No.	Time (days)	Depth (ft)	C1	C2	C2:	C3	C3:	iso-C4	n-C4
1	7	9	656.0	t	-	0.2	-	0.07	0.21
		19	87.1	-	-	-	-	-	-
	14	9	138.0	-	-	0.2	-	0.06	0.17
		19	76.8	-	-	-	-	-	-
	21	9	466.0	0.1	-	0.3	-	2.26	0.98
		19	82.8	-	-	0.1	-	1.28	0.55
2	7	11	18731.0	4.6	0.7	2.7	0.4	1.23	0.81
		21	6475.0	8.1	-	3.4	-	5.08	0.69
	14	11	23834.0	5.8	0.7	2.9	0.2	1.70	0.77
		21	6048.0	7.5	-	3.2	0.2	4.99	0.44
	21	11	20739.0	6.0	0.8	2.8	0	2.49	0.99
		21	7110.0	7.3	-	3.3	-	5.35	0.64

Table 9. (continued)

C_1-C_4 HYDROCARBONS IN MONITORING WELL GAS (ppm)

Well No.	Time (days)	Depth (ft)	C1	C2	C2:	C3	C3:	iso-C4	n-C4
3	7	6	1.4	-	-	-	-	0.06	0.3[illegible]
		16	1.6	-	-	0.1	-	-	-
	14	6	2.8	0.1	-	0.5	-	0.09	0.07
		16	2.1	-	-	0.1	-	0.01	0.02
	21	6	2.4	t	-	t	-	0.34	0.16
		16	2.7	t	t	t	-	0.50	0.27
4	7	11	15698.0	0.9	-	0.6	-	0.50	0.56
		21	189.0	-	-	-	-	0.12	0.02
	14	11	4010.0	0.2	-	0.4	-	0.56	0.54
		21	30.2	-	-	-	-	0.39	0.17
	21	11	1104.0	0.1	-	0.2	-	0.41	0.26
		21	141.7	0.5	-	t	-	0.33	0.11

Table 9. (continued)

C_1-C_4 HYDROCARBONS IN MONITORING WELL GAS (ppm)

Well No.	Time (days)	Depth (ft)	C1	C2	C2:	C3	C3:	iso-C4	n-C4
7	7	11	101.0	-	-	0.2	-	2.55	1.11
		21	16136.0	3.2	9.4	22.9	0.2	337.00	107.00
	14	11	29.2	-	t	0.1	-	0.54	0.22
		21	9303.0	1.7	4.4	12.4	-	161.00	40.10
	21	11	12.8	-	-	-	-	1.35	0.88
		21	11370.0	22.4	6.1	16.6	-	214.00	59.20
8	7	11	26253.0	29.7	9.7	188.0	-	2668.0	652.00
		21	30844.0	40.2	12.8	243.0	-	3415.00	859.00
	14	11	17111.0	19.6	5.3	149.0	-	1973.00	382.00
		21	26236.0	36.7	11.1	258.0	-	3241.00	693.00
	21	11	17234.0	20.1	5.4	156.4	-	2106.10	418.60
		21	28594.0	40.7	12.3	273.1	-	3503.33	723.36

Table 9. (continued)

C_1-C_4 HYDROCARBONS IN MONITORING WELL GAS (ppm)

Well No.	Time (days)	Depth (ft)	C1	C2	C2:	C3	C3:	iso-C4	n-C4
5	7	11	23196.0	1.1	2.7	4.3	0.6	58.30	15.90
		21	17146.0	4.4	5.4	43.6	0.4	754.00	208.00
	14	11	6369.0	0.2	0.2	1.9	-	26.90	5.42
		21	13941.0	3.8	4.1	42.3	-	640.00	145.00
	21	11	3694.0	-	-	-	20.8	1.71	2.72
		21	13461.0	3.5	4.2	39.2	-	637.17	141.65
6	7	11	31761.0	27.7	6.3	183.0	0.9	1984.00	931.00
		21	72461.0	72.4	27.4	389.0	-	4549.00	2068.00
	14	11	168.0	0.2	-	17.9	-	375.00	119.00
		21	57516.0	50.0	12.6	303.0	1.0	3058.00	1312.00
	21	11	144.4	0.1	-	3.9	-	195.80	19.40
		21	74218.0	68.9	24.8	390.0	2.7	4036.00	1726.00

Table 6
Summary of Soil Analytical Results - Volatile and Semivolatile Aromatics
Walker Property Site

Location ID	Depth (feet)	Date Collected	Consultant	Benzene 8020	Ethyl-benzene 8020	Toluene 8020	Xylene 8020	TRPH 418.1	TPH as Diesel 8015	TPH as Gasoline 8015
1	25-40	4/01/85	D&M	(0.05)	(0.05)	(0.05)	(0.05)			
2	25-30	4/01/85	D&M	(0.05)	(0.05)	(0.05)	(0.05)			
3	11-13.5	4/01/85	D&M	(0.05)	(0.05)	(0.05)	(0.05)			
4	1.5-8.5	4/01/85	D&M	(0.05)	(0.05)	(0.05)	(0.05)			
5A	3.5-6	4/01/85	D&M	(0.05)	(0.05)	0.64	(0.05)			
5B	3.5	4/01/85	D&M	(0.05)	(0.05)	0.49				
6	6-13.5	4/01/85	D&M	(0.05)	(0.05)	(0.05)	(0.05)			
7A	4.5-9.5	4/01/85	D&M	(0.05)	(0.05)	0.06				
7B	2-3.5	4/01/85	D&M	(0.05)	5.5	62	44			
8	20.5-25	4/01/85	D&M	(0.05)	(0.05)	(0.05)	(0.05)			
C3	1	10/01/86	D&M							
E-1	10	12/01/88	EMCON	(0.08)	0.12	0.44	0.62		(10)	2.93
E-1	30	12/01/88	EMCON	(0.13)	5.20	0.33	4.12		1690	186
E-1	70	12/01/88	EMCON	1.26	0.35	0.10	0.66		(10)	3.10
E-1	80	12/01/88	EMCON		64.6	12.5	30.7		1570	3350
E-1	90	12/01/88	EMCON	3.84	26.5	6.25	15.2		1570	1230
E-1	95	12/01/88	EMCON	5.44	36.6	8.68	21.5		2090	1790
E-2	10	12/01/88	EMCON						(10)	(1.0)
E-2	20	12/01/88	EMCON						(10)	1.2
E-2	30	12/01/88	EMCON						(10)	(1.0)
E-2	40	12/01/88	EMCON						(10)	(1.0)
E-2	50	12/01/88	EMCON						(10)	(1.0)
E-3	10	12/01/88	EMCON						(10)	(1.0)
E-3	20	12/01/88	EMCON						(10)	(1.0)
E-3	30	12/01/88	EMCON						(10)	(1.0)
E-3	40	12/01/88	EMCON						(10)	(1.0)
E-4	10	12/01/88	EMCON						(10)	(1.0)
E-4	20	12/01/88	EMCON						(10)	(1.0)
E-4	30	12/01/88	EMCON						(10)	(1.0)
E-4	40	12/01/88	EMCON						(10)	(1.0)
Excavation 3	1.5-2	10/01/89	TRC					150000		
Excavation 9	6	10/01/89	TRC					46000		

() Indicates compound not detected at or above enclosed reporting limit.
All results reported in milligrams per kilograms.

Table 6
Summary of Soil Analytical Results - Volatile and Semivolatile Aromatics
Walker Property Site

Location ID	Depth (feet)	Date Collected	Consultant	Benzene 8020	Ethyl-benzene 8020	Toluene 8020	Xylene 8020	TRPH 418.1	TPH as Diesel 8015	TPH as Gasoline 8015
Excavation 11	7	10/01/89	TRC	(0.05)	0.08	(0.05)	0.10			(1.0)
FB-1	10	2/06/90	TRC						53	
FB-1	40	2/06/90	TRC						(5)	
FB-2	40	2/06/90	TRC						(5)	
FB-3	20	2/06/90	TRC						(5)	
FB-4	20	2/06/90	TRC						(5)	
FB-5	20	2/06/90	TRC						(5)	
JB-1	20	1/01/90	TRC						4400	
JB-1	101-103	1/01/90	TRC						5900	
JB-1	107.5	1/01/90	TRC						10000	
JB-2	30	1/01/90	TRC						(5)	
JB-2	70	1/01/90	TRC						(5)	
JB-2	103-105	1/01/90	TRC						(5)	
JB-3	20	1/01/90	TRC						4200	
JB-3	40	1/01/90	TRC						(5)	
JB-3	90	1/01/90	TRC						(5)	
JB-3	100.5	1/01/90	TRC						(5)	
JB-4	70	1/01/90	TRC						(5)	
JB-4	90	1/01/90	TRC						(5)	
JB-5	30	1/01/90	TRC						5500	
JB-5	40	1/01/90	TRC						(5)	
JB-5	90	1/01/90	TRC						(5)	
JB-5	101	1/01/90	TRC						(5)	
JB-6	30	1/01/90	TRC						(5)	
JB-6	70	1/01/90	TRC						(5)	
JB-6	100	1/01/90	TRC						(5)	
JB-7	40	1/01/90	TRC						(5)	
JB-7	90	1/01/90	TRC						(5)	
JB-7	102.5	1/01/90	TRC						3200	
JB-8	20	1/01/90	TRC						7500	
JB-8	70	1/01/90	TRC						4000	
JB-8	90	1/01/90	TRC						(5)	

() Indicates compound not detected at or above enclosed reporting limit.
All results reported in milligrams per kilogram.

Table 6

Summary of Soil Analytical Results - Volatile and Semivolatile Aromatics

Walker Property Site

Location ID	Depth (feet)	Date Collected	Consultant	Benzene 8020	Ethyl-benzene 8020	Toluene 8020	Xylene 8020	TRPH 418.1	TPH as Diesel 8015	TPH as Gasoline 8015
JB-8	100.5	1/01/90	TRC						(5)	
JB-9	10	1/01/90	TRC						870	
JB-9	100	1/01/90	TRC						1300	
JB-9	105	1/01/90	TRC						2500	
JB-10	30	1/01/90	TRC						(5)	
JB-10	70	1/01/90	TRC						(5)	
JB-10	106-107	1/01/90	TRC						(5)	
L14	5	10/01/86	D&M							
JB-9	50	1/01/90	TRC						(5)	
JB-9	70	1/01/90	TRC						14	
PT-1	1	1/01/90	TRC							(5)
PT-2	13	1/01/90	TRC							(5)
PT-3	10	1/01/90	TRC							33
PT-4	10	1/01/90	TRC							(5)
PT-5	12	1/01/90	TRC							49
PT-6	12	1/01/90	TRC							2900
TMB-1	20	10/01/89	TRC							(1.0)
PT-13	13	1/01/90	TRC							(5)
TMB-2	15	10/01/89	TRC					8.5		
TMB-2	25	10/01/89	TRC					(5)		
TMB-3	10	10/01/89	TRC							2200
TMB-3	30	10/01/89	TRC							3.3
TMB-4	10	10/01/89	TRC							(5)
TMB-5	10	10/01/89	TRC					11000		
TMB-5	20	10/01/89	TRC					(5)		
TMB-6	10	10/01/89	TRC					7000		
TMB-6	15	10/01/89	TRC					(5)		
TMB-7	10	10/01/98	TRC					110		
TMB-8	10	10/01/89	TRC					(5)		
TMB-9	10	10/01/89	TRC					1900		
TSB-3 (W-1)	20	10/01/89	TRC					(5)		
TSB-3 (W-1)	35	10/01/89	TRC							(5)

() Indicates compound not detected at or above enclosed reporting limit.

All results reported in milligrams per kilograms.

Table 6

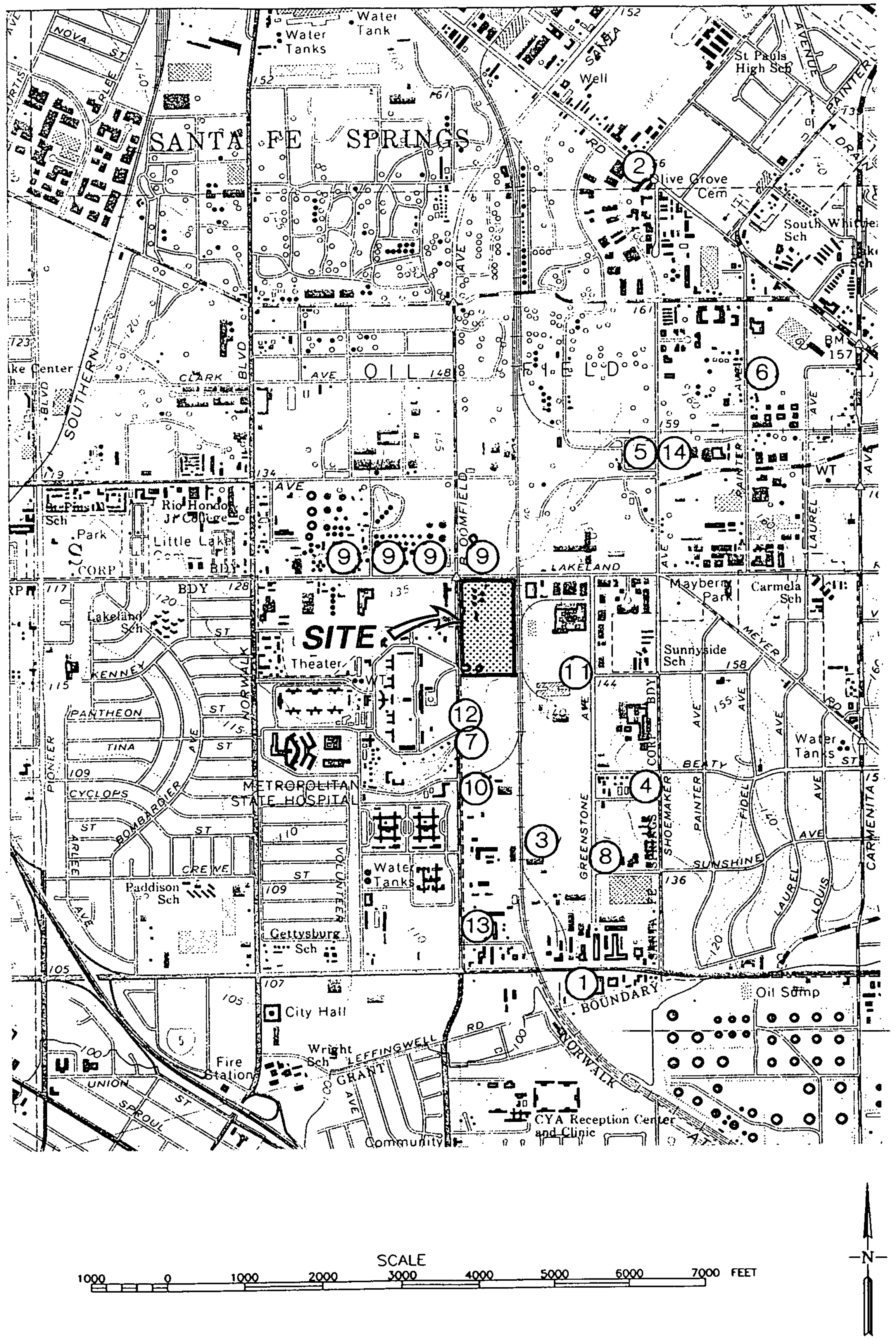
Summary of Soil Analytical Results - Volatile and Semivolatile Aromatics

Walker Property Site

Location ID	Depth (feet)	Date Collected	Consultant	Benzene 8020	Ethyl-benzene 8020	Toluene 8020	Xylene 8020	TRPH 418.1	TPH as Diesel 8015	TPH as Gasoline 8015
TSB-4	30	10/01/89	TRC					(5)		
TSB-5 (W-2)	60	10/01/89	TRC					(5)		
TSB-6	30	10/01/89	TRC	(0.05)	(0.05)	(0.05)	(0.05)			(1.0)
TSB-6	10	10/01/89	TRC	0.14	22	4.4	120			1800
TSB-7 (W-3)	20	10/01/89	TRC					11000		
TSB-7 (W-3)	100	10/01/89	TRC					12000		12000
TSB-7 (W-3)	110	10/01/89	TRC					(5)		(100)
TW-10	13	10/01/89	TRC	(0.05)	(0.05)	(0.05)	(0.05)			(1.0)
TW-11	3	10/01/89	TRC					73000		(5)
TW-11	7	10/01/89	TRC							(5)
TW-2	15	10/01/89	TRC							(5)
TW-3	18	10/01/89	TRC					(5)		
TW-4	5	10/01/89	TRC	(0.05)	(0.05)	0.15	(0.05)			
TW-4	15	10/01/89	TRC	(0.05)	0.88	(0.05)	5.3			
TW-4B	15	10/01/89	TRC							(5)
TW-5	5	10/01/89	TRC					570		(5)
TW-9	18	10/01/89	TRC							(5)
TW-17	15	10/01/89	TRC	(0.05)	0.88	(0.05)	5.3			
TW-19	15	10/01/89	TRC							5.3
TW-20B	10	10/01/89	TRC							440
TW-B1	25	10/01/89	TRC							(5)
TW-B1	35	10/01/89	TRC							(5)
TW-B2	15	10/01/89	TRC					24		

() Indicates compound not detected at or above enclosed reporting limit.
All results reported in milligrams per kilograms.

ILLUSTRATIONS



OTHER POTENTIALLY CONTAMINATED SITES

1. Neville Chemical, NPL Site
2. Waste Disposal, NPL Site
3. KOBRA Inc., Hazardous Waste Site List
4. KALICO Dump No. 1, Hazardous Waste Site List
5. Mobil Oil Co., Hazardous Waste Site List (McGranahan/Carlson)
6. Ashland Chemical Co., RWQCB PCE Site
7. Magna Corporation, RWQCB UST Site
8. Life Paint Co., Hazardous Waste Site List
9. Powerine Refinery, RWQCB Site
10. Unnamed Site, RWQCB UST Site
11. Camall Trucking Co., RWQCB UST Site
12. Kelly Pipe, Local Agency UST Site
13. Halliburton Services, Local Agency UST Site
14. Mobil Oil Co., RWQCB Site (Yozya Development Co.)

ABBREVIATIONS

NPL = National Priorities List (Federal Superfund)
RWQCB = Regional Water Quality Control Board
PCE = Tetrachloroethene
UST = Underground Storage Tank

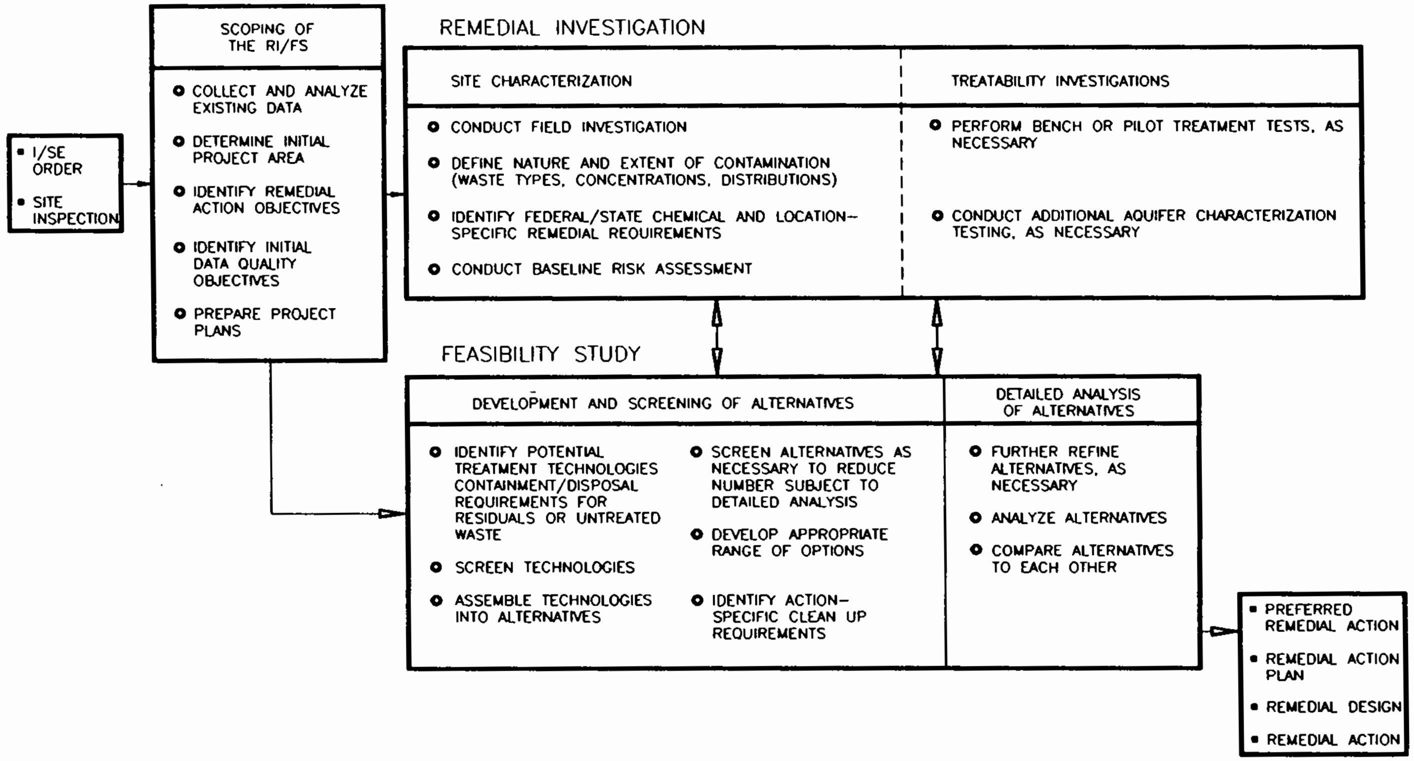
Reference: USGS 7.5-minute quadrangle, Whittier, California (photorevised 1981).

Harding Lawson Associates
Engineering and Environmental Services

VICINITY MAP
Walker Property Site
Santa Fe Springs, California

PLATE 1

DRAWN	PROJECT-TASK NUMBER	APPROVED	DATE	REVISED	DATE
LJH	22263-2	DWG	4/93		

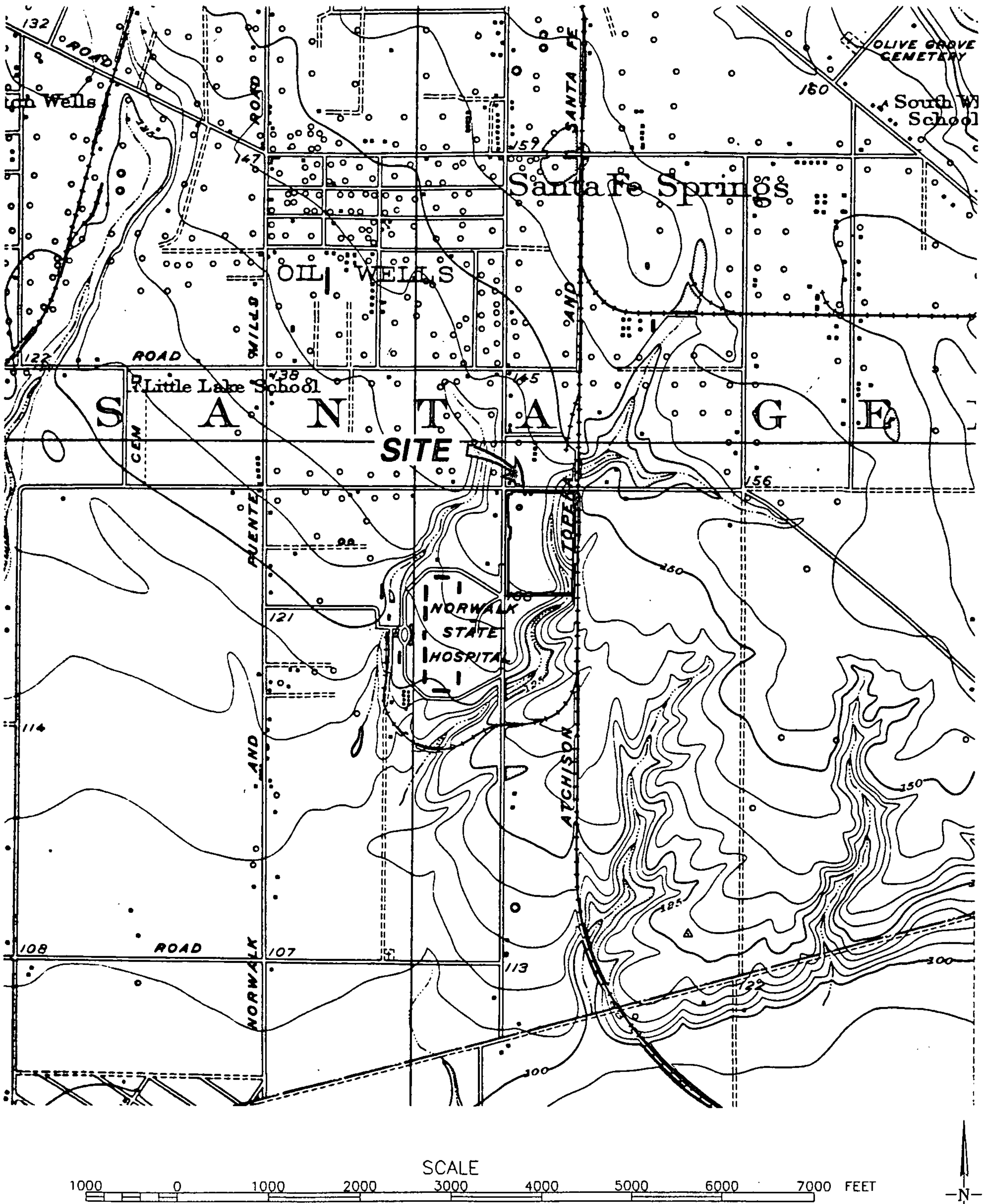


Harding Lawson Associates
Engineering and Environmental Services

RI/FS PROCESS
Walker Property Site
Santa Fe Springs, California

PLATE 3

DRAWN	PROJECT-TASK NUMBER	APPROVED	DATE	REVISED	DATE
LJH	22263-2	DWQ	2/93		



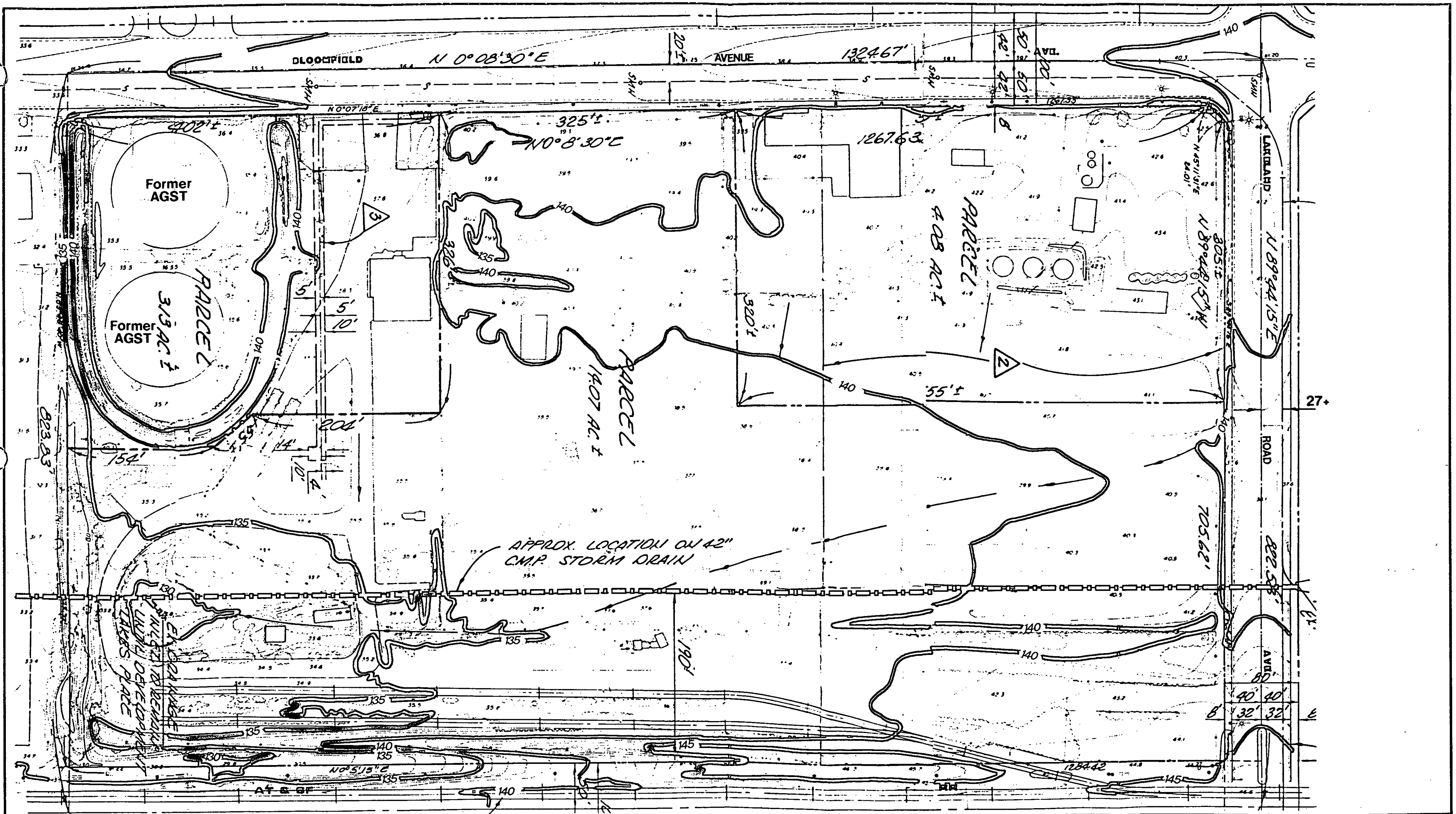
Reference: Army Map Services, 1942, Reproduced from USGS 7.5-minute quadrangle, Whittier, California 1925.

Harding Lawson Associates
Engineering and Environmental Services

SITE TOPOGRAPHY - 1925
Walker Property Site
Santa Fe Springs, California

PLATE 4

DRAWN	PROJECT-TASK NUMBER	APPROVED	DATE	REVISED	DATE
LJH	22263-2	DWQ	2/93		



Note: Best copy presently available

Reference: Wildan Associates, Tentative Parcel Map No. 20177, Spetember 27, 1988

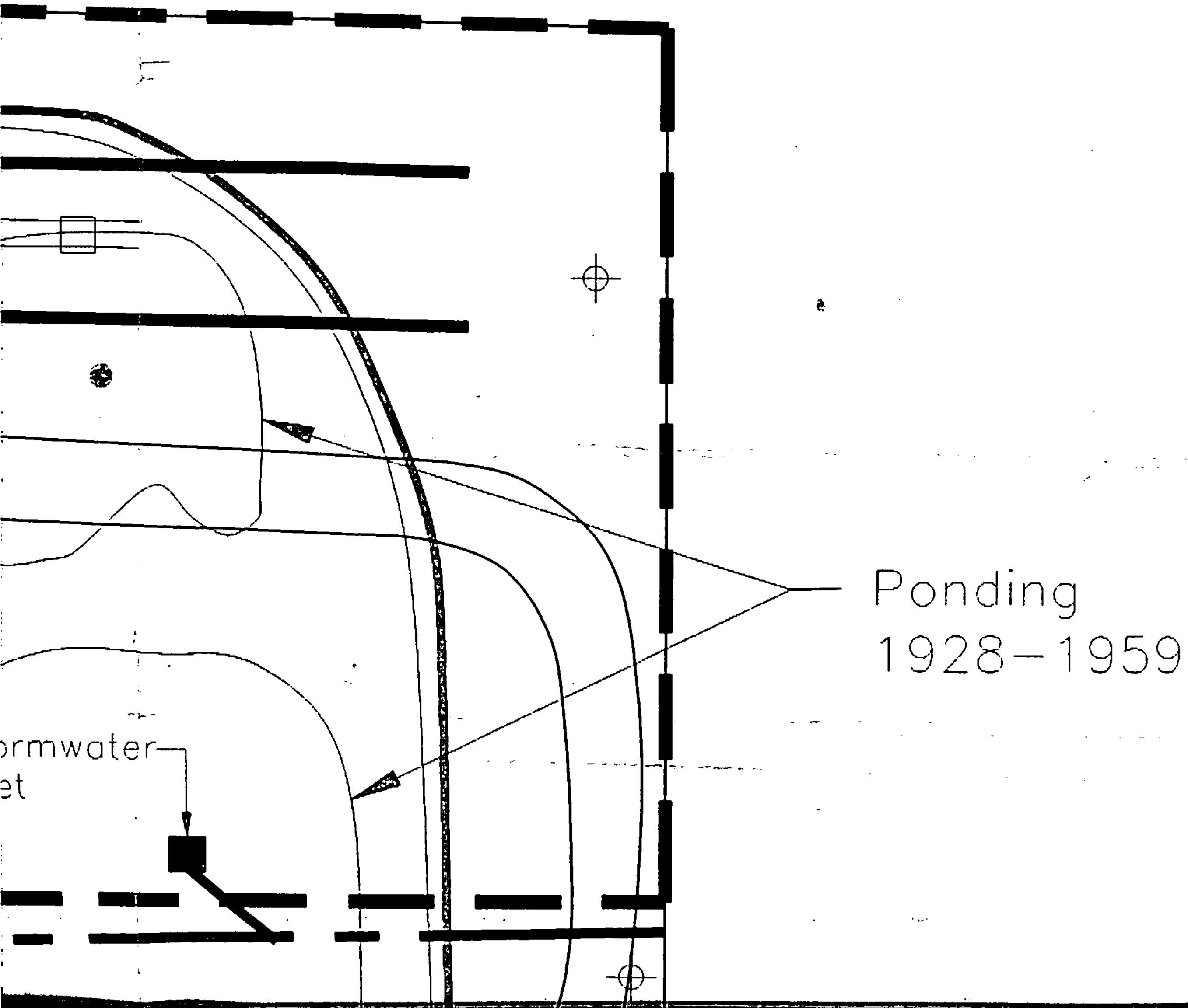
Harding Lawson Associates
Engineering and Environmental Services

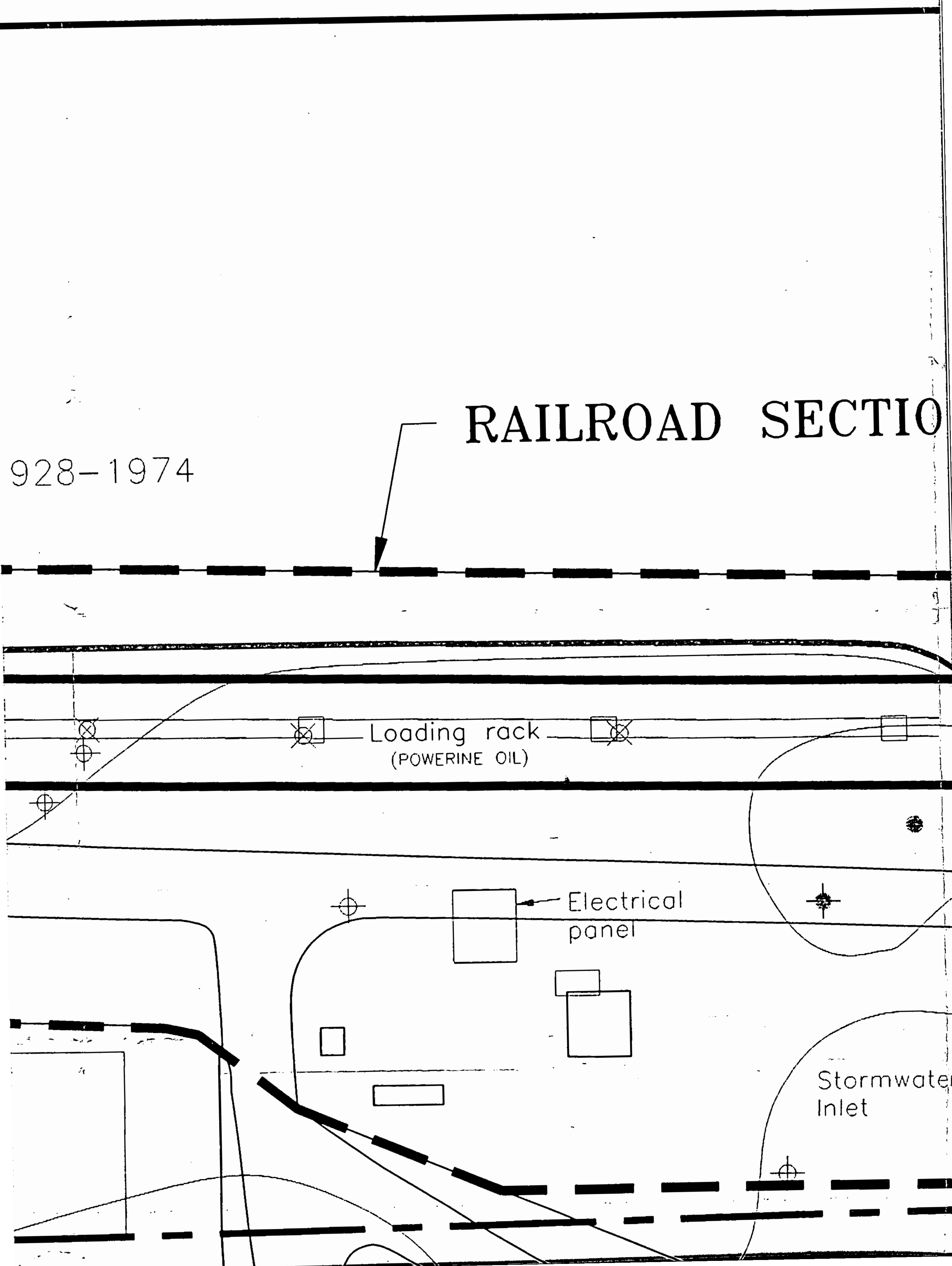
SITE TOPOGRAPHY - 1988
Walker Property Site
Santa Fe Springs, California

PLATE 5

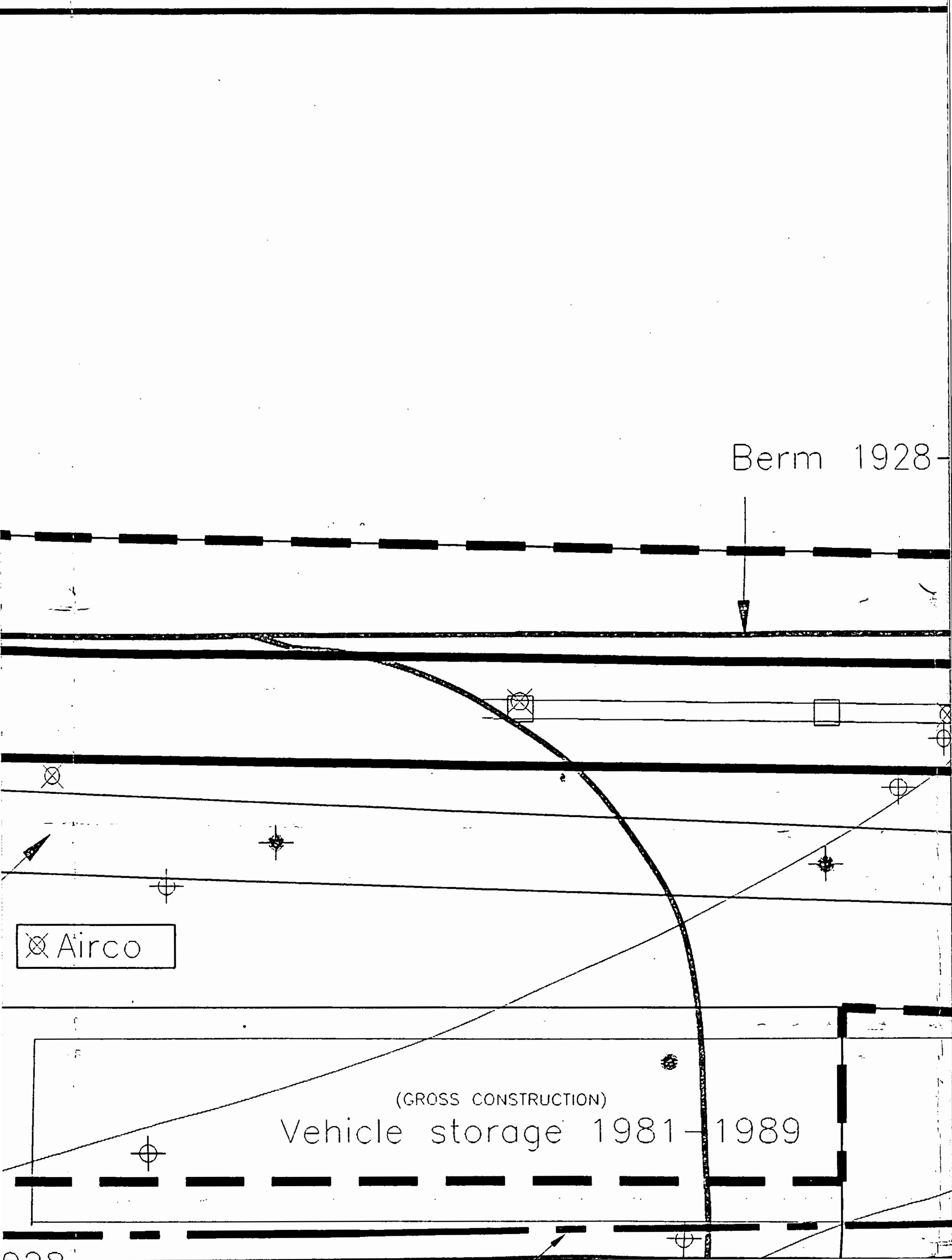
DRAWN	PROJECT-TASK NUMBER	APPROVED	DATE	REVISED	DATE
LJH	22263-2	DWQ	2/93		

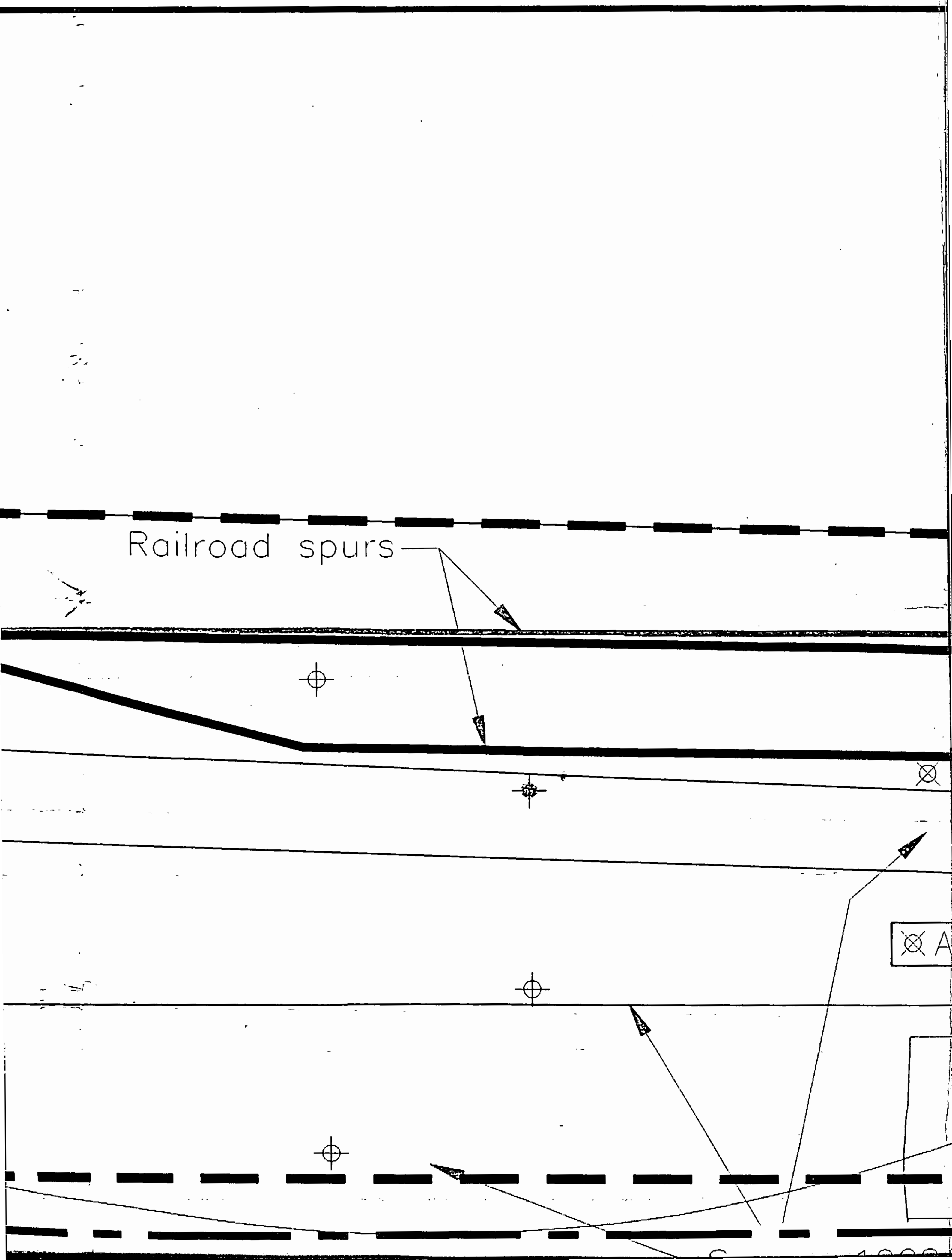
CTION

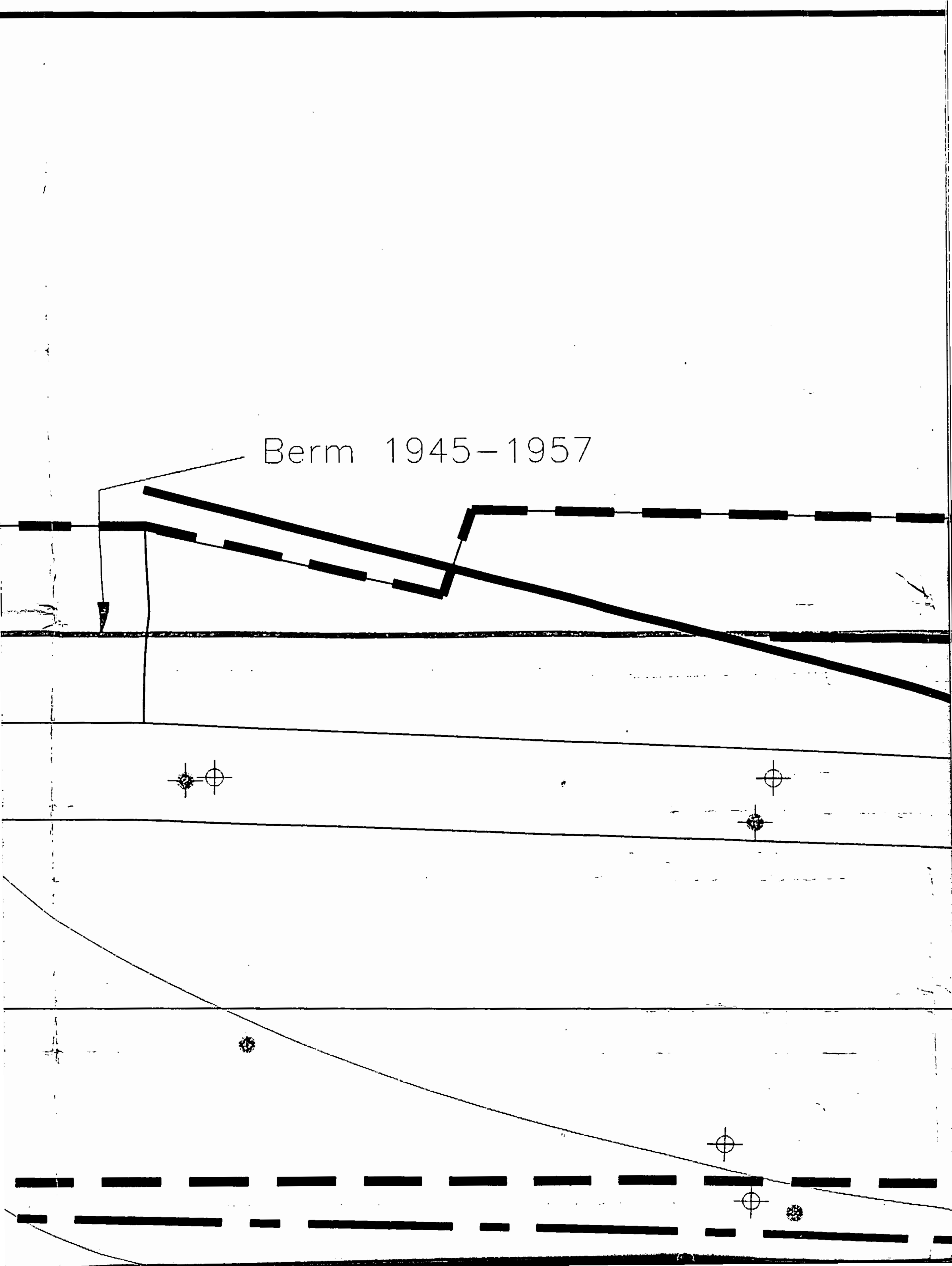




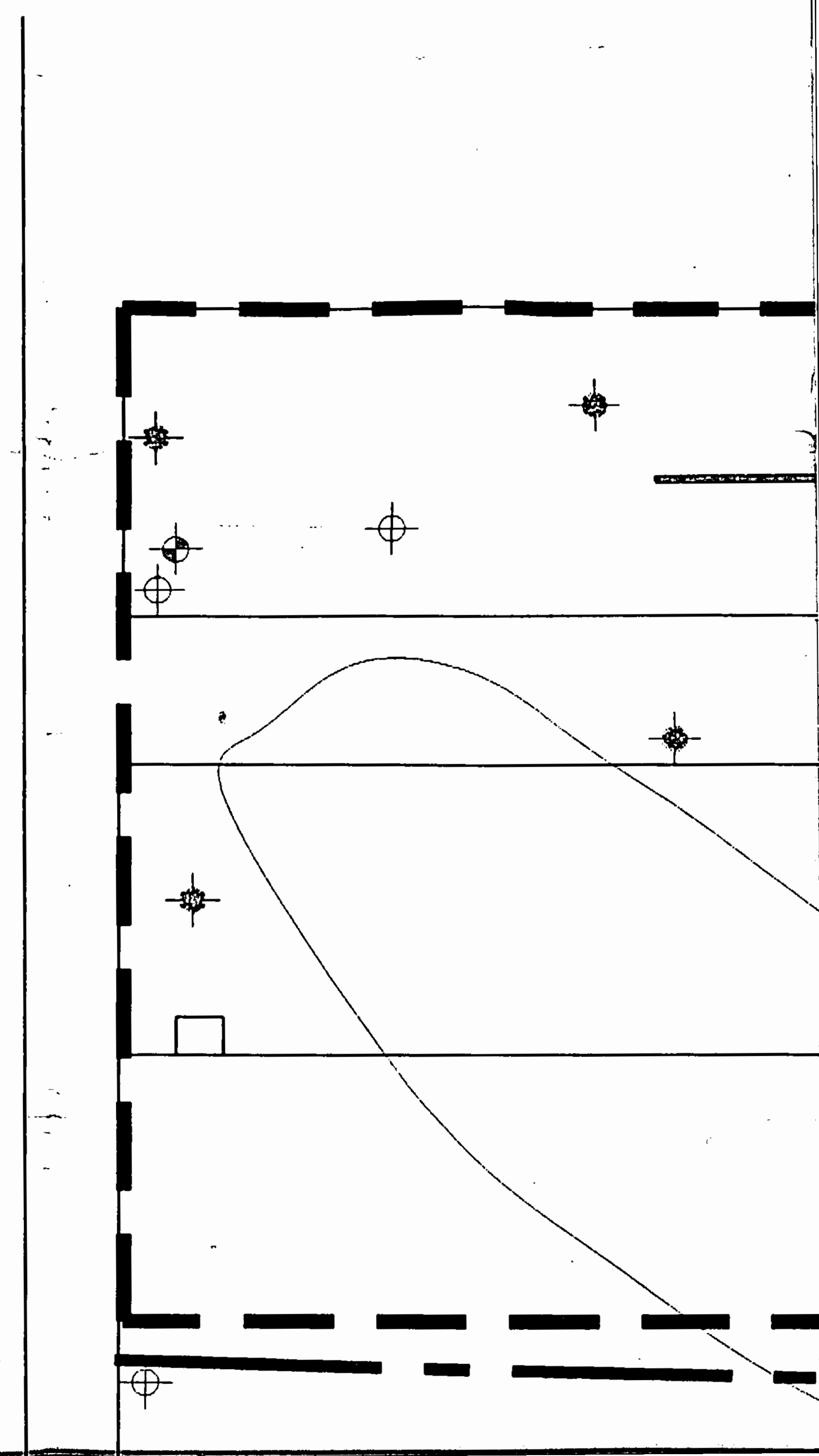
RAILROAD SECTIO
928-1974
Loading rack
(POWERINE OIL)
Electrical
panel
Stormwate
Inlet

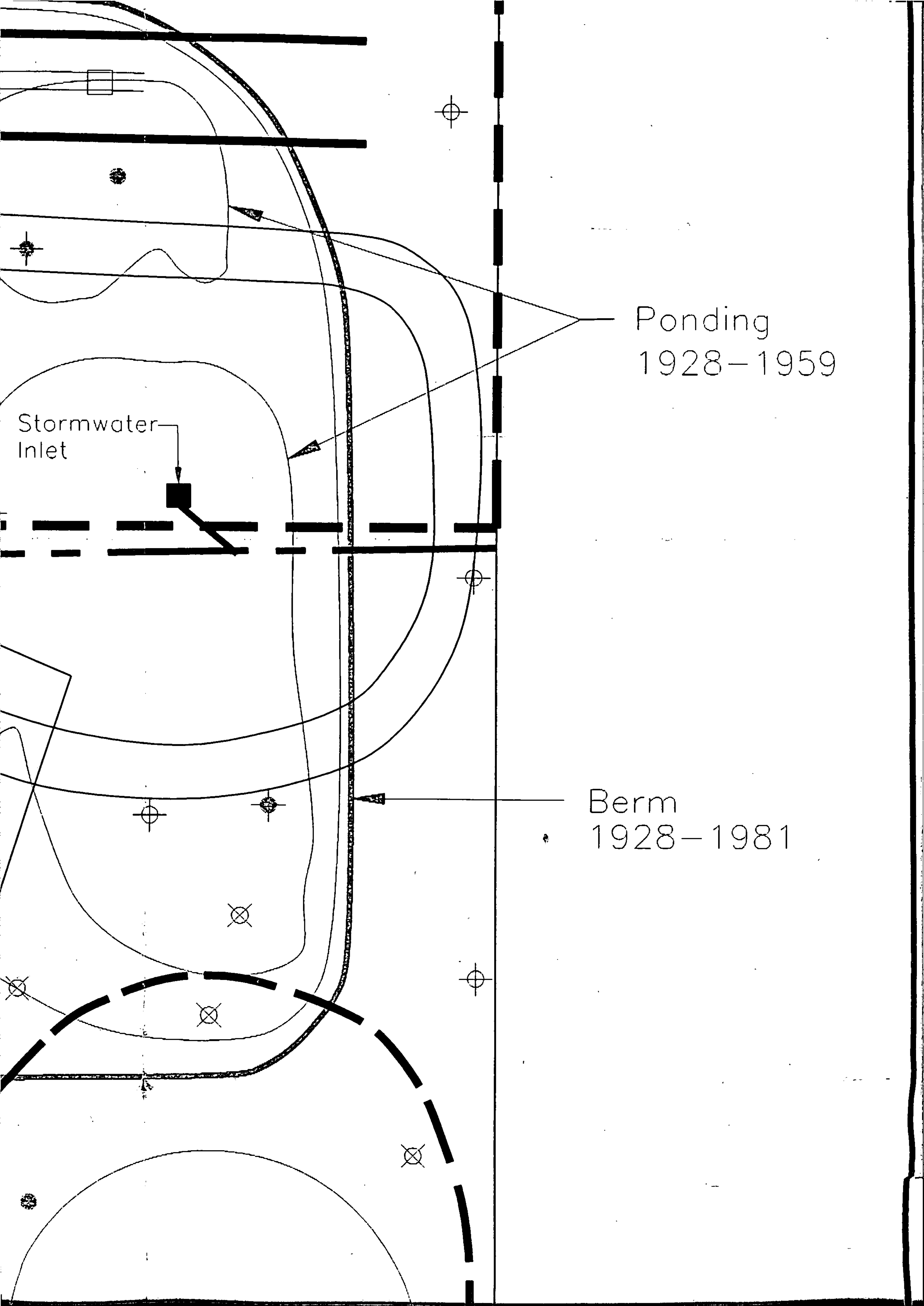

Berm 1928-
Airco
(GROSS CONSTRUCTION)
Vehicle storage 1981-1989

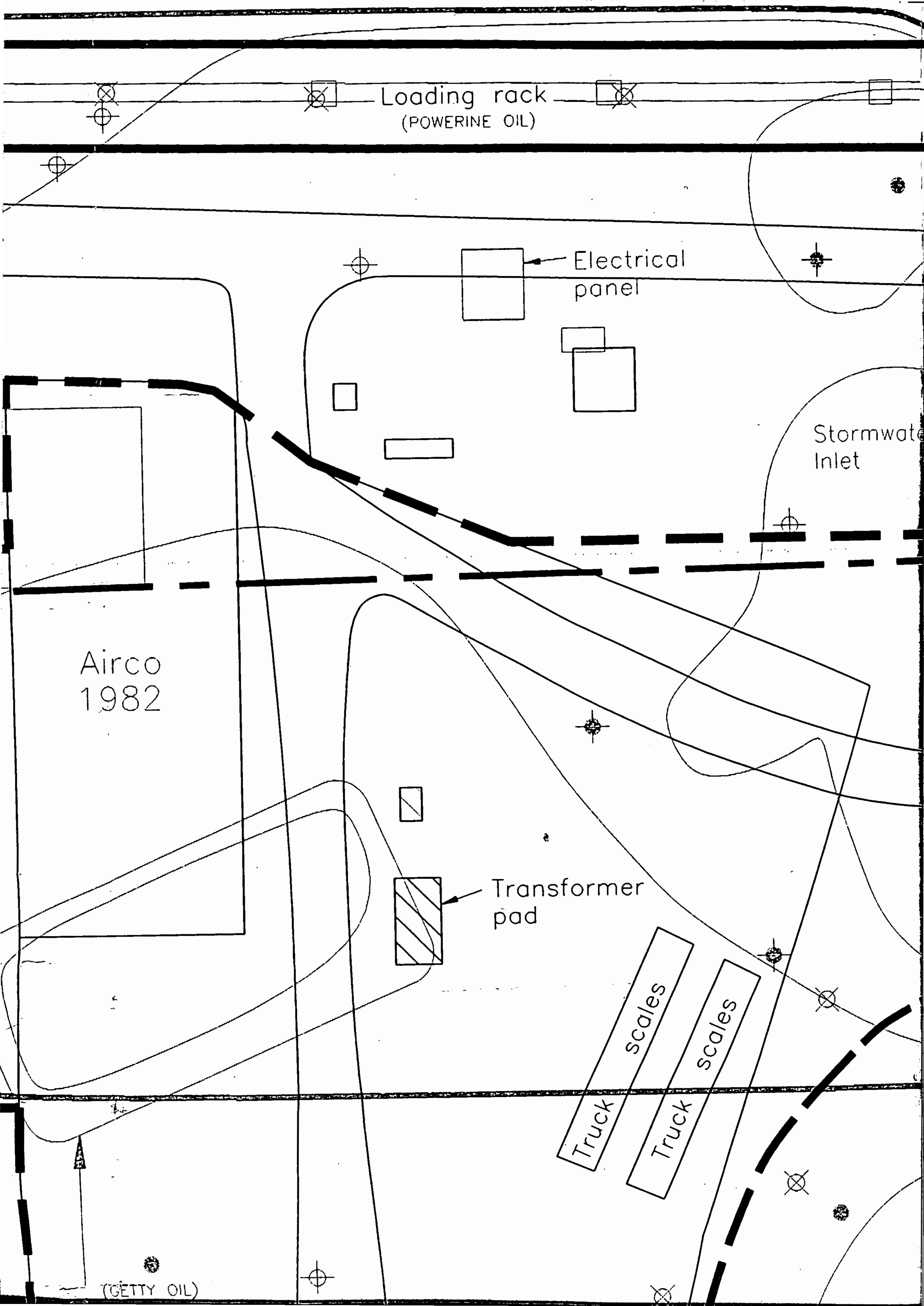

Railroad spurs

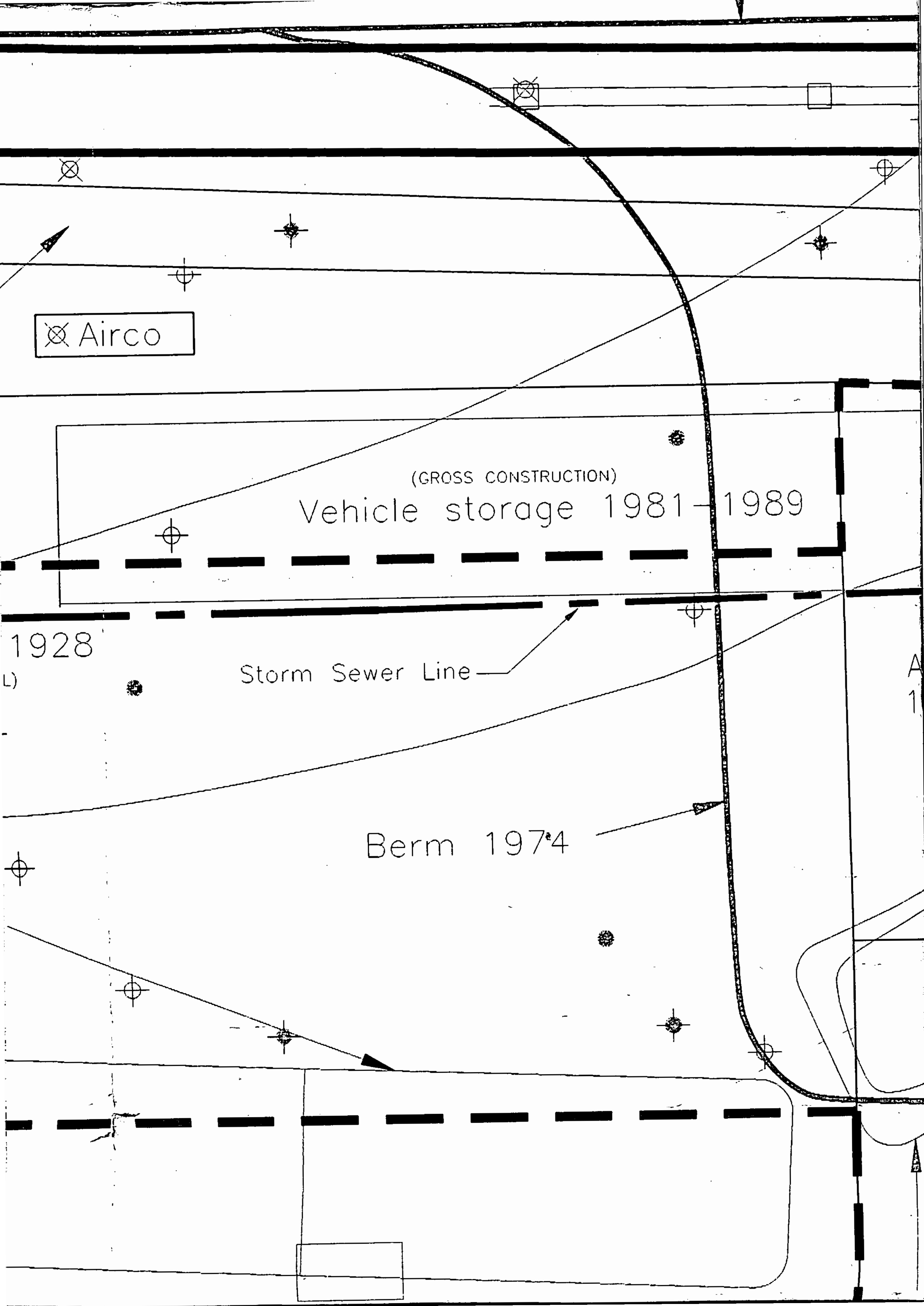

Berm 1945–1957

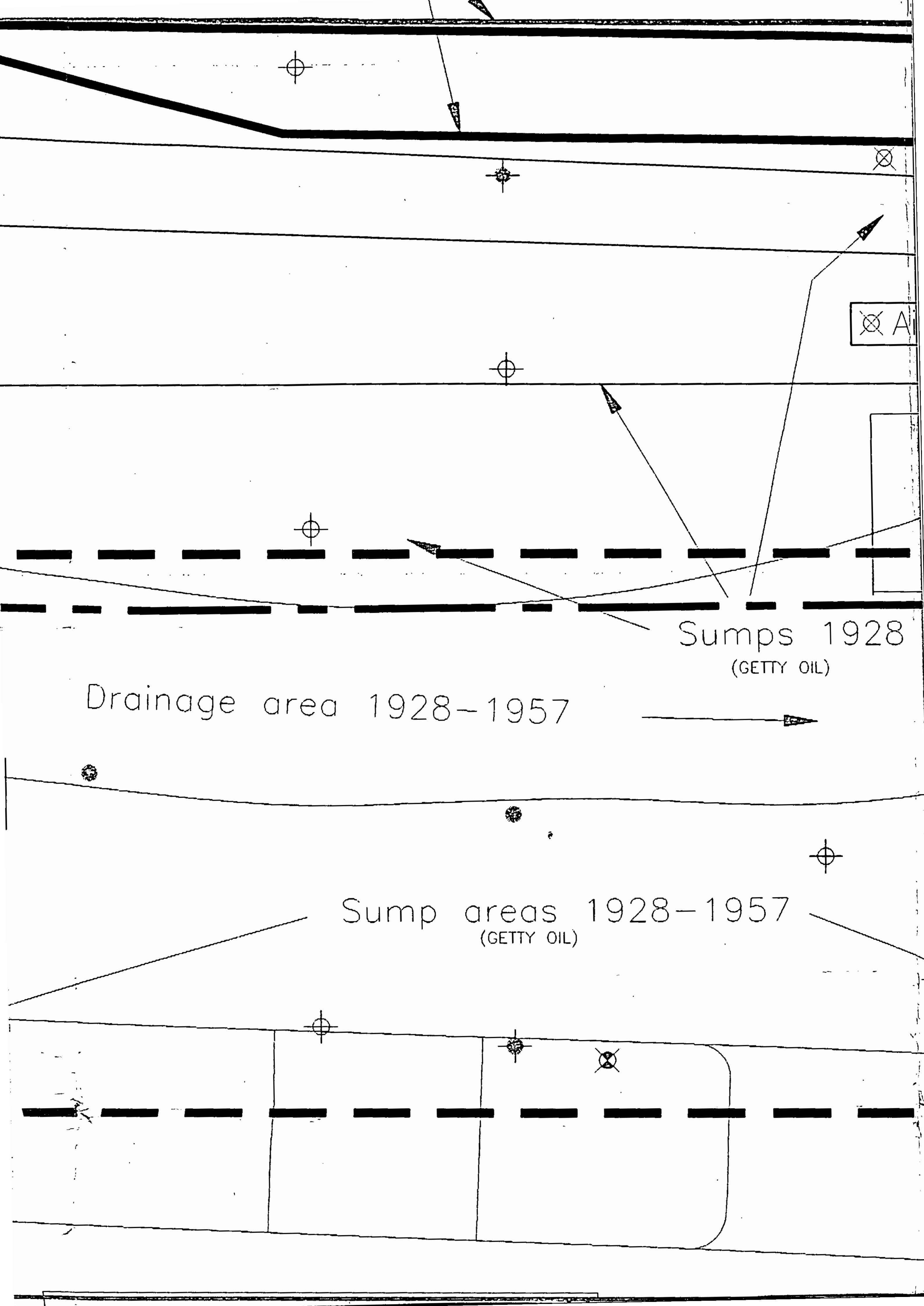
USER1 HDL\22263\2\S1A

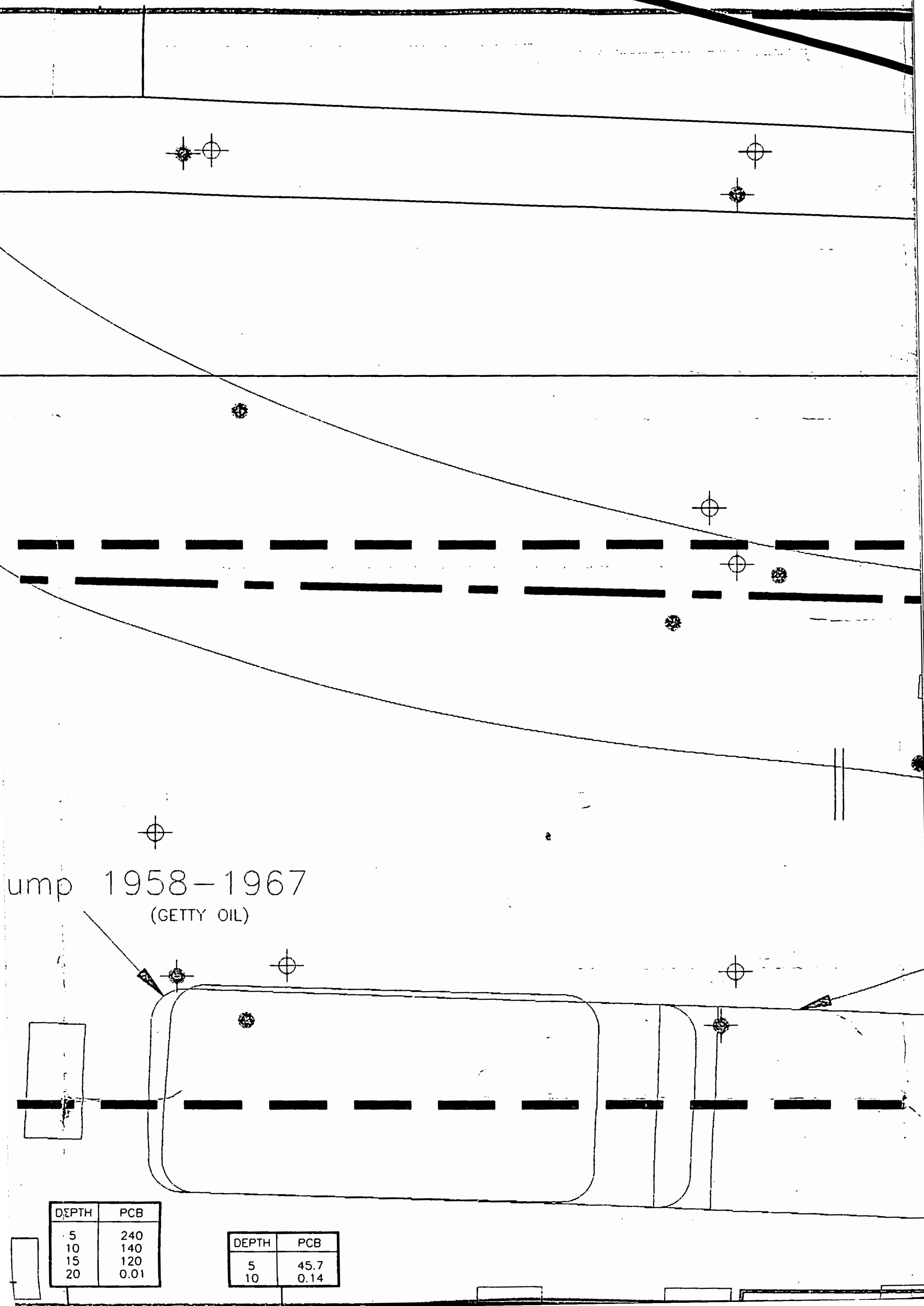



Ponding
1928–1959
Stormwater
Inlet
Berm
1928–1981


Loading rack
(POWERINE OIL)
Electrical panel
Stormwate
Inlet
Airco
1982
Transformer pad
Truck scales
Truck scales
(GETTY OIL)

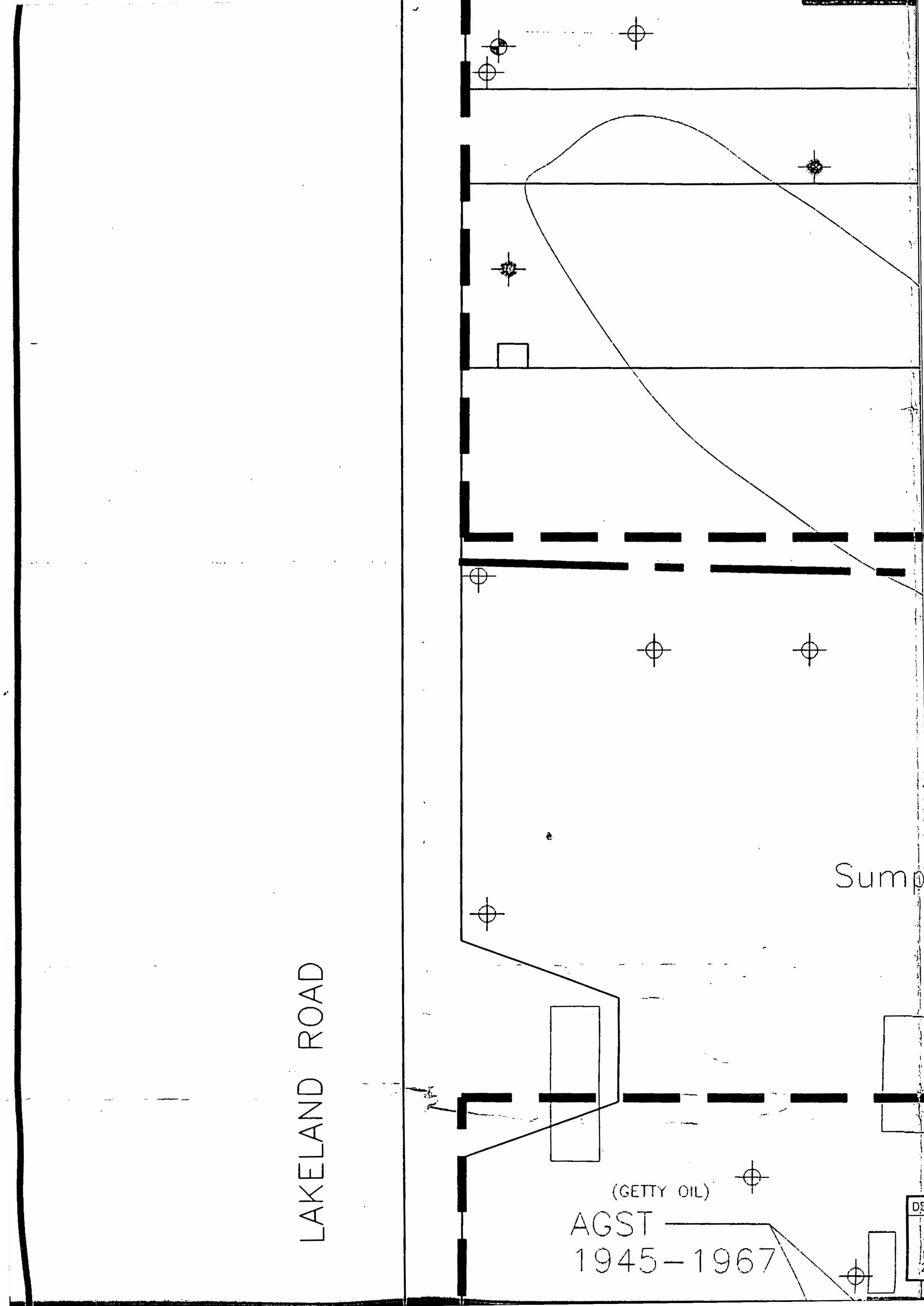

Airco
(GROSS CONSTRUCTION)
Vehicle storage 1981-1989
1928
L)
Storm Sewer Line
Berm 1974
A
1

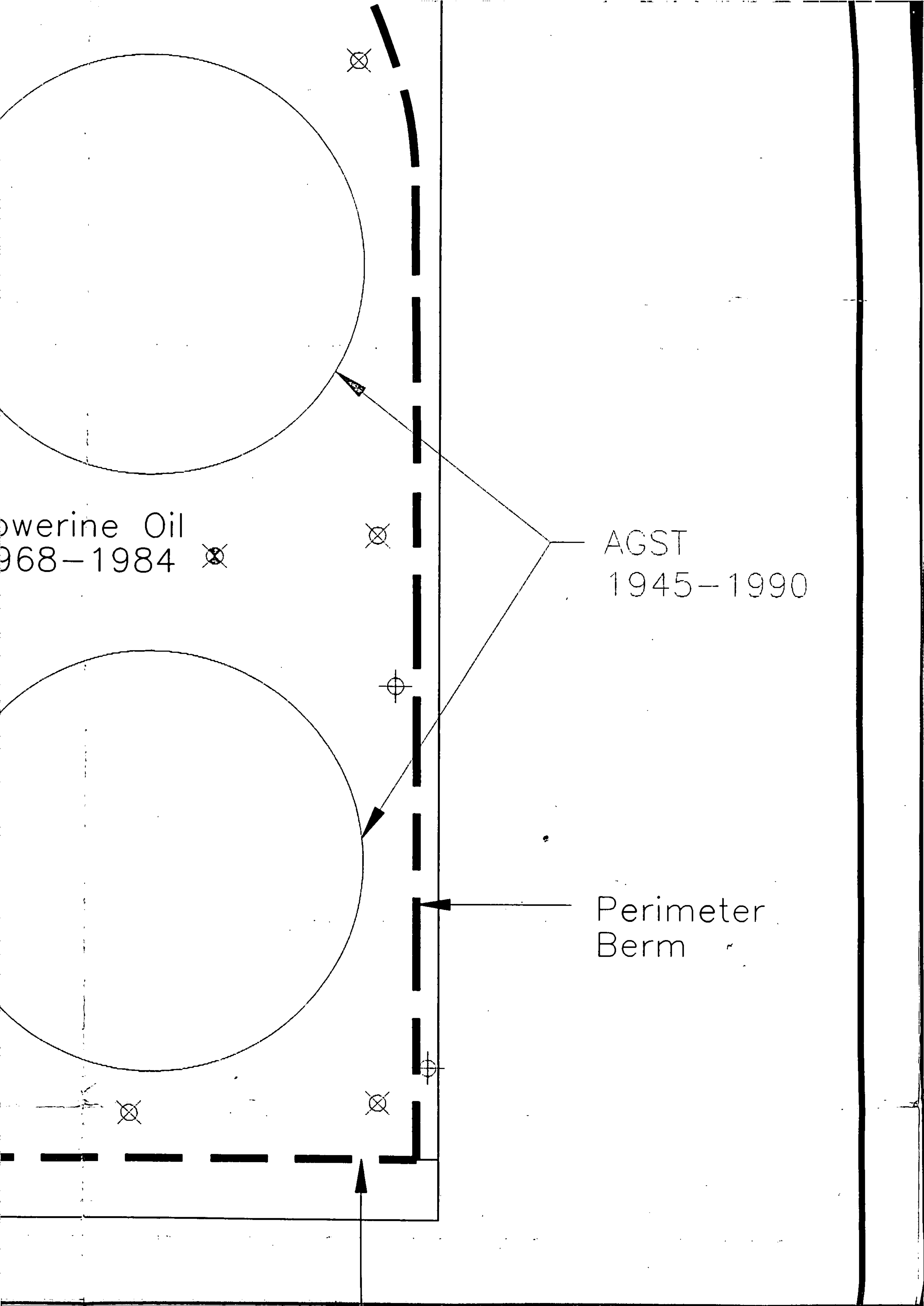

Sumps 1928
(GETTY OIL)
Drainage area 1928–1957
Sump areas 1928–1957
(GETTY OIL)

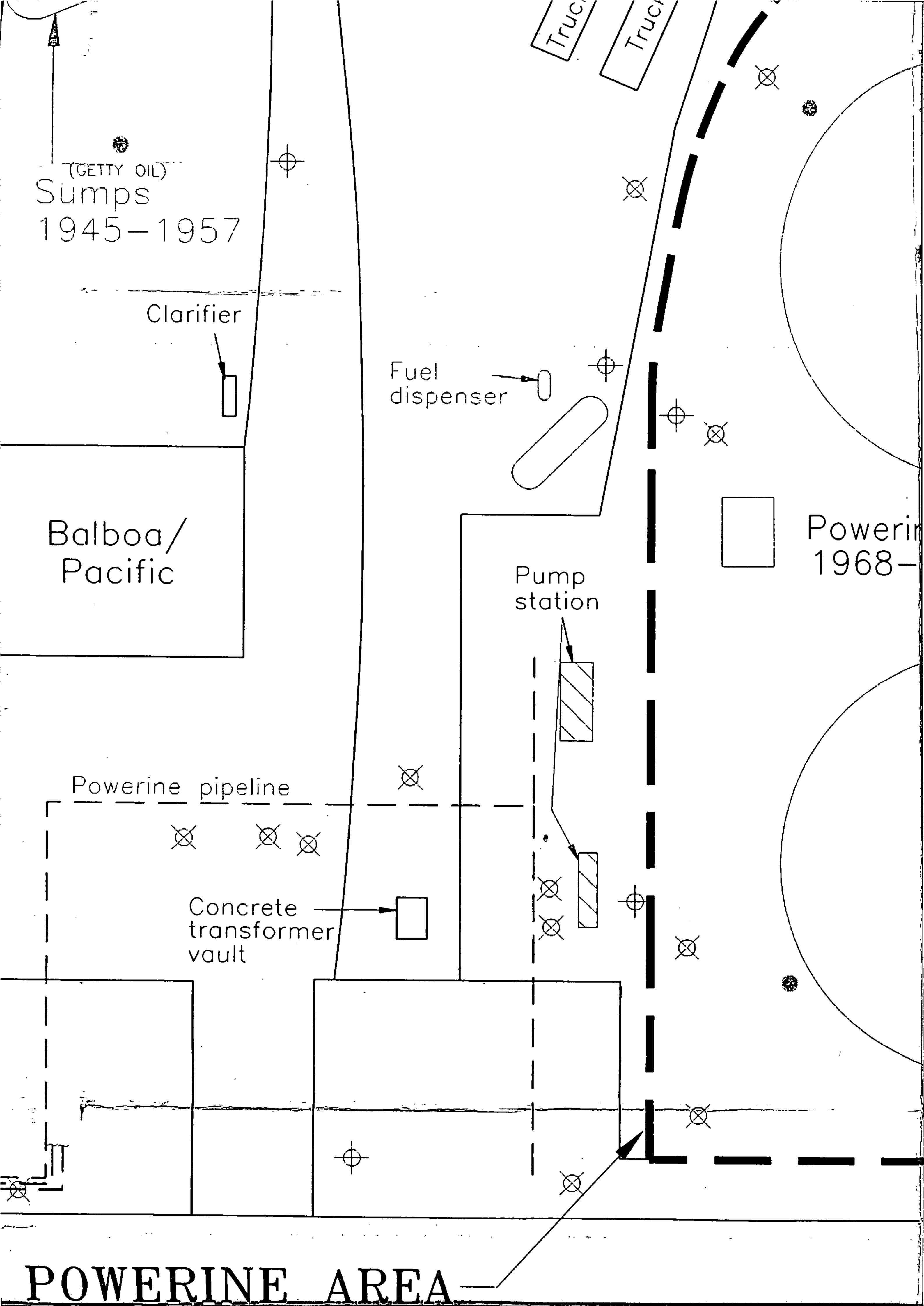


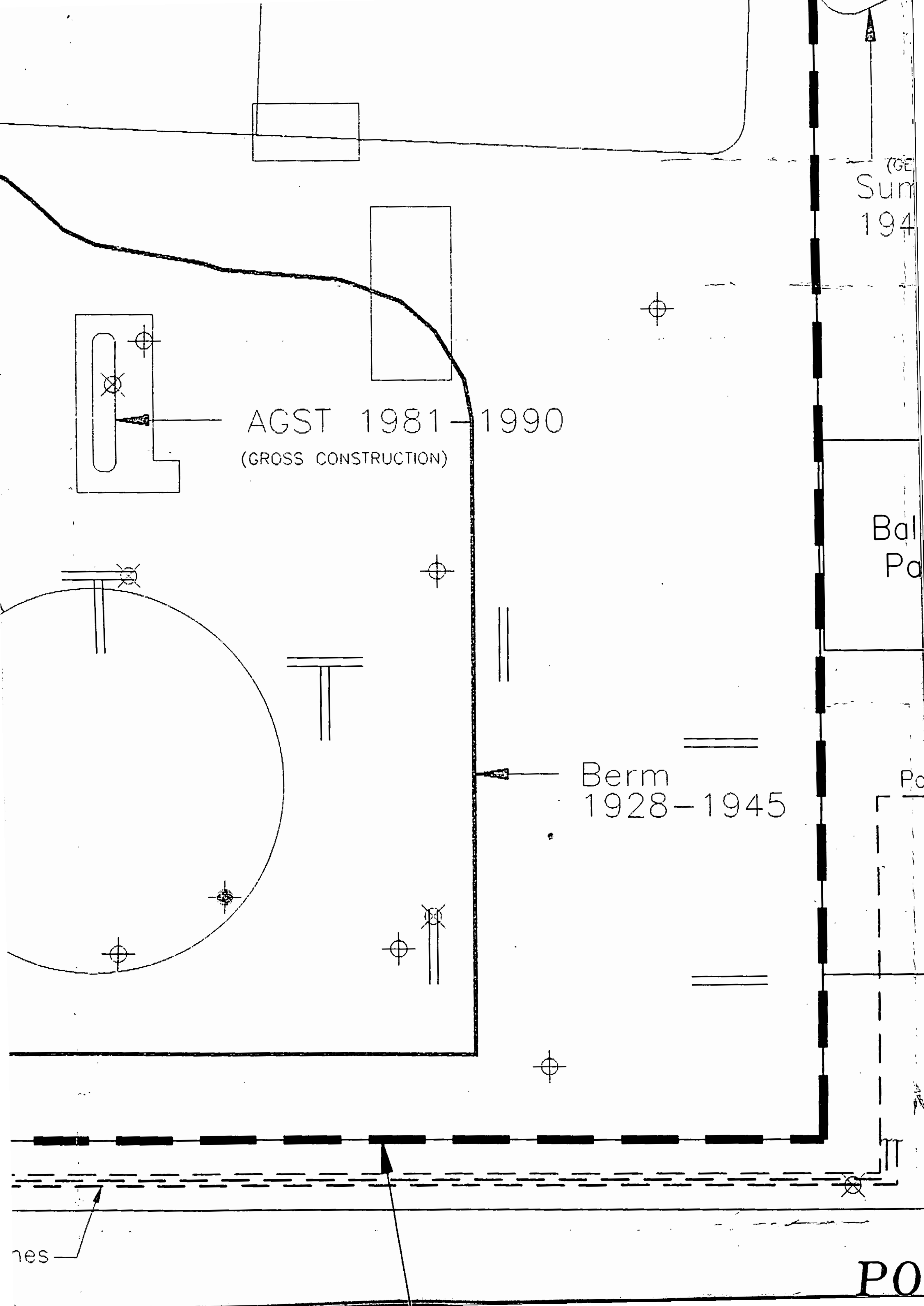
DEPTH	PCB
5	240
10	140
15	120
20	0.01

DEPTH	PCB
5	45.7
10	0.14

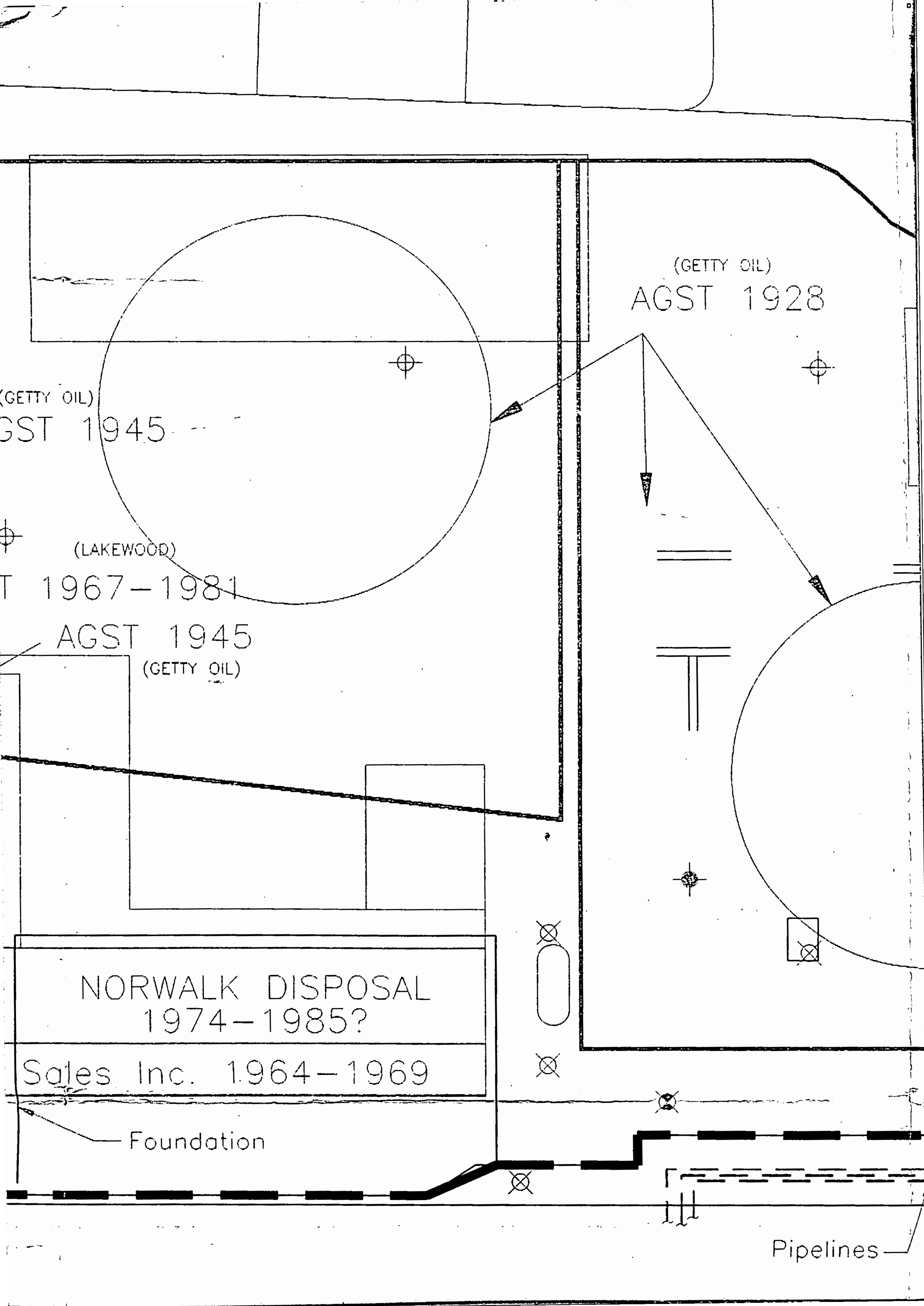

LAKELAND ROAD
Sump
(GETTY OIL)
AGST
1945-1967

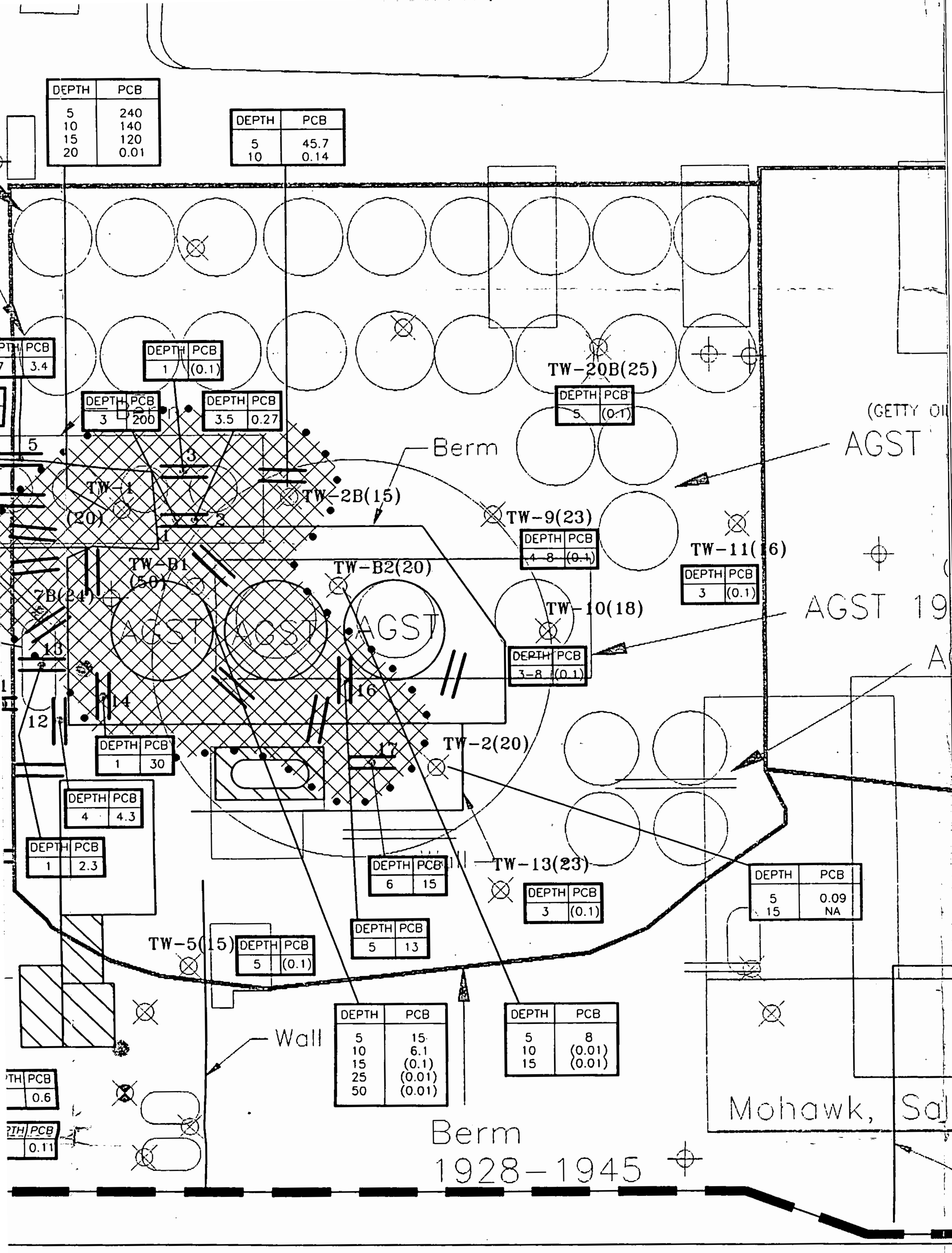

owerine Oil
968–1984
AGST
1945–1990
Perimeter
Berm


(GETTY OIL)
Sumps
1945-1957
Clarifier
Balboa/
Pacific
Fuel
dispenser
Pump
station
Powerine pipeline
Concrete
transformer
vault
POWERINE AREA

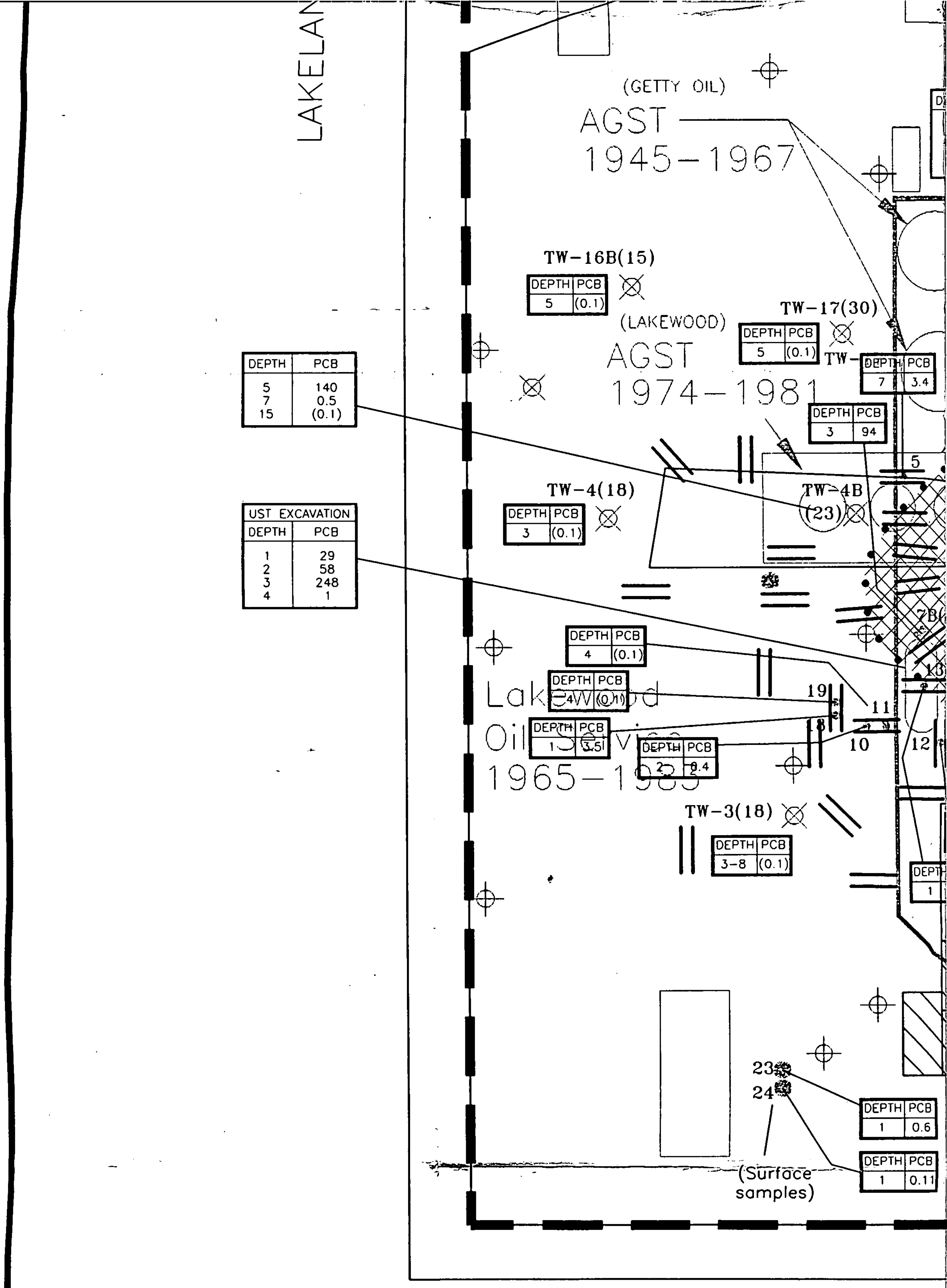


(GE
Sum
194
AGST 1981–1990
(GROSS CONSTRUCTION)
Bal
Pa
Berm
1928–1945
Po
nes
PO

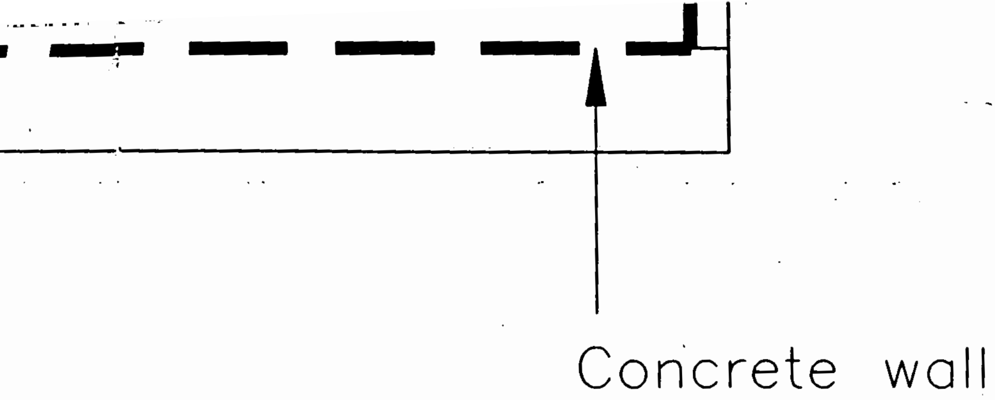

(GETTY OIL)
AGST 1928
(GETTY OIL)
GST 1945
(LAKEWOOD)
T 1967-1981
AGST 1945
(GETTY OIL)
NORWALK DISPOSAL
1974-1985?
Sales Inc. 1964-1969
Foundation
Pipelines



DEPTH PCB
5 240
10 140
15 120
20 0.01
DEPTH PCB
5 45.7
10 0.14
PCB
3.4
DEPTH PCB
1 (0.1)
DEPTH PCB
3 200
DEPTH PCB
3.5 0.27
TW-20B(25)
DEPTH PCB
5 (0.1)
(GETTY OI
AGST
Berm
5
3
TW-1
(20)
TW-2B(15)
2
1
TW-9(23)
DEPTH PCB
4-8 (0.1)
TW-11(16)
DEPTH PCB
3 (0.1)
TW-B1
(50)
TW-B2(20)
7B(24)
AGST
AGST
AGST
TW-10(18)
AGST 19
DEPTH PCB
3-8 (0.1)
13
16
14
12
DEPTH PCB
1 30
17
TW-2(20)
DEPTH PCB
4 4.3
DEPTH PCB
1 2.3
DEPTH PCB
6 15
Wall
TW-13(23)
DEPTH PCB
3 (0.1)
DEPTH PCB
5 0.09
15 NA
DEPTH PCB
5 13
TW-5(15)
DEPTH PCB
5 (0.1)
DEPTH PCB
5 15
10 6.1
15 (0.1)
25 (0.01)
50 (0.01)
DEPTH PCB
5 8
10 (0.01)
15 (0.01)
Wall
PCB
0.6
PCB
0.11
Mohawk, Sa
Berm
1928-1945



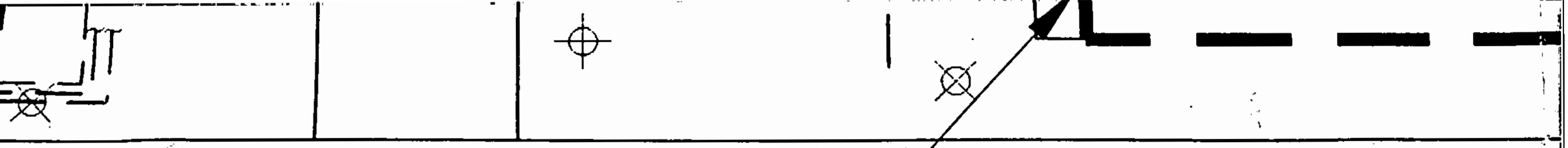
EXPLANANTION



Harding Lawson Associates
Engineering and
Environmental Services

3 Hutton Centre Drive
Suite 300
Santa Ana, CA 92707

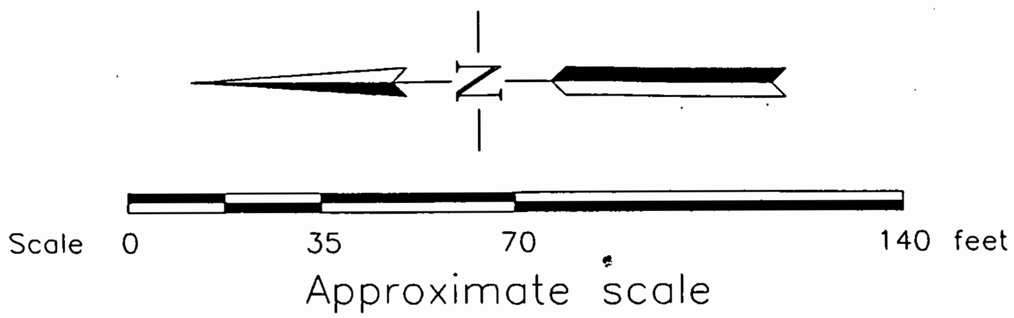
HLA PROJECT NUMBER 22263-2	CLIENT NAME TEXACO, INC.		
DRAWN BY: LJH — DATE 2/93	DRAWING TITLE EXISTING PCB DATA Walker Property Site Santa Fe Springs, California		PLATE 7a
CHECKED BY: [illegible] — DATE 4/93			
APPROVED BY: — DATE HLA: [illegible] 4/93 CLIENT:	SCALE 1" = 100'		

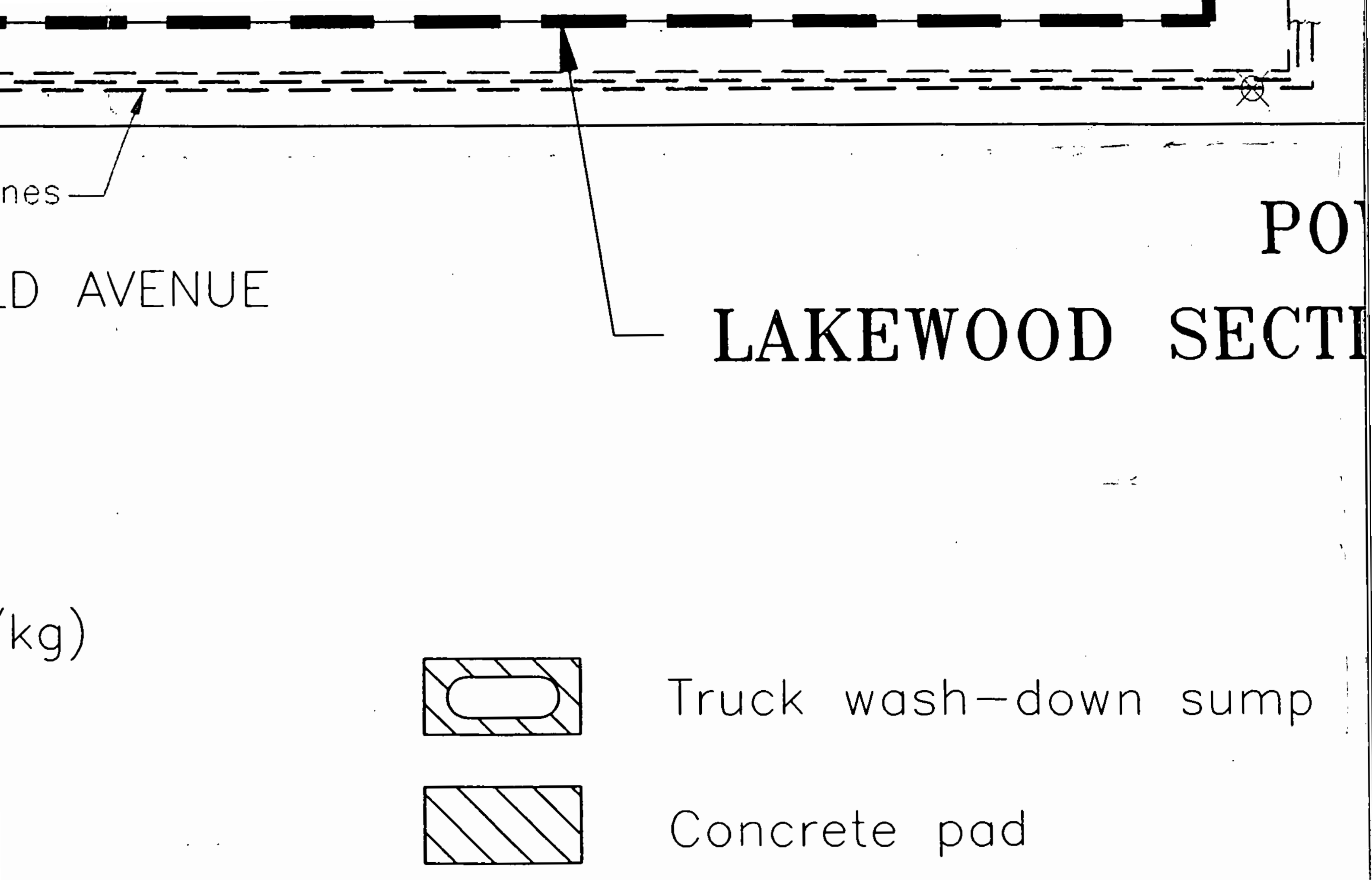


POWERINE AREA

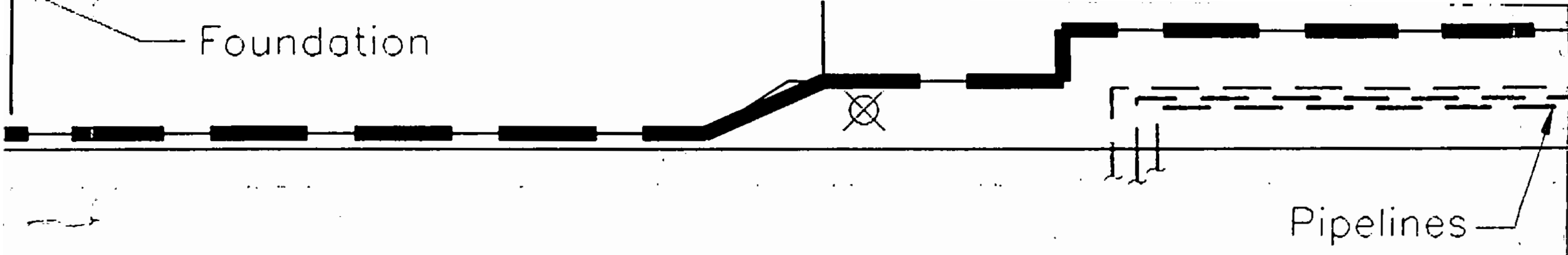
ECTION

mp





nes
LD AVENUE
PO
LAKEWOOD SECTI
(kg)
Truck wash-down sump
Concrete pad



ates existing features

ates previous features

centrations in milligrams per kilogram (mg/kg)

n feet

d sample locations not analyzed
s

1928–1945

e soil boring
oring)

ig

tical vapor well

oring)

hes by Dames and Moore
proximately 8 to 9 feet)
location

hes by TRC
location

of PCB concentrations
mg/kg

Black line indicates

Gray line indicates

NOTE

PCB concent

Depths in fe

Unlabeled sa
for PCBs

samples)

EXPLANANTION

7B(24)

Boring No.

Depth (feet)

Dames and Moore s
(total depth of bori

EMCON soil boring

EMCON well

Geoscience Analytica

TW-1(20)

TRC soil boring
(total depth of bori

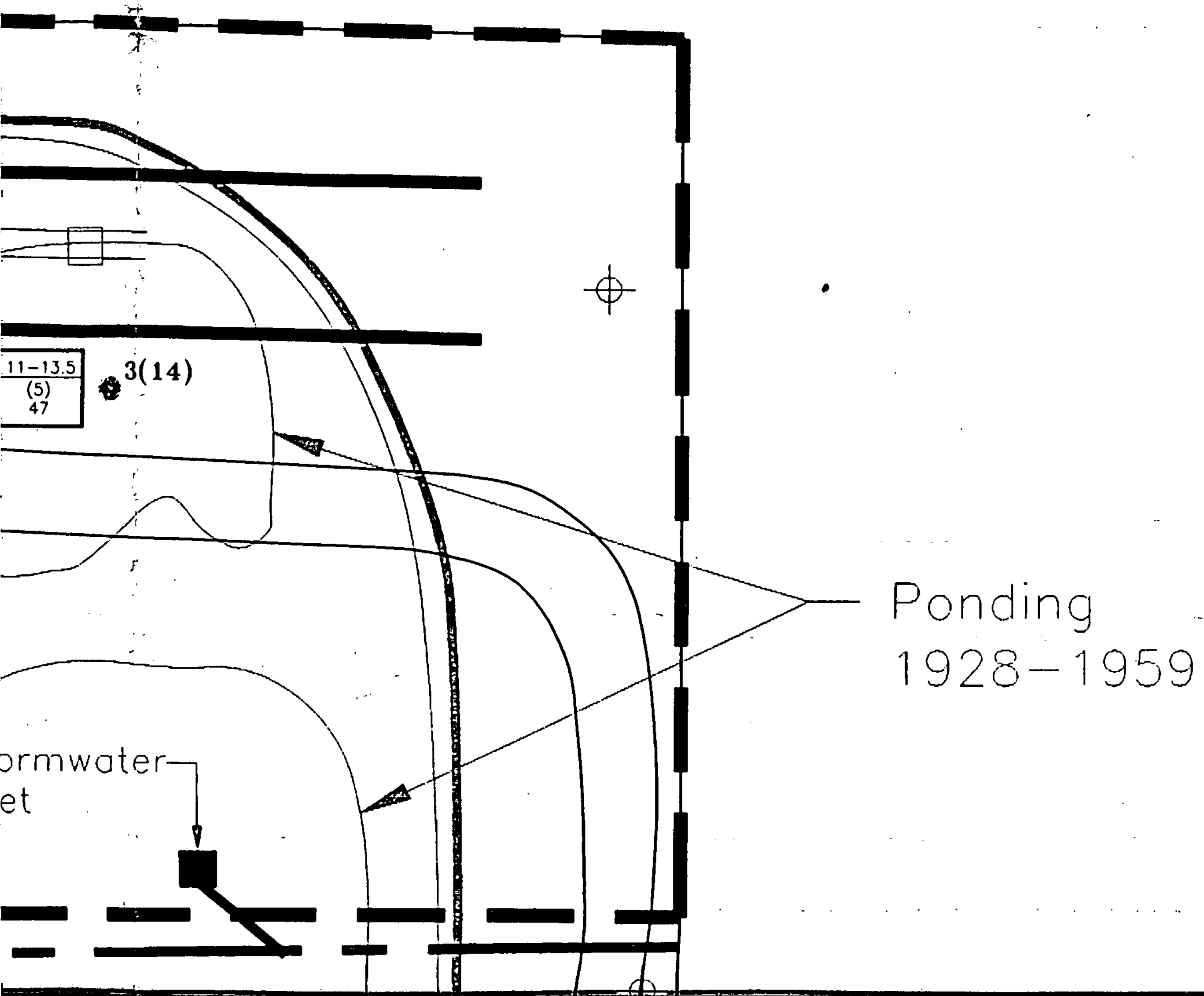
TRC well

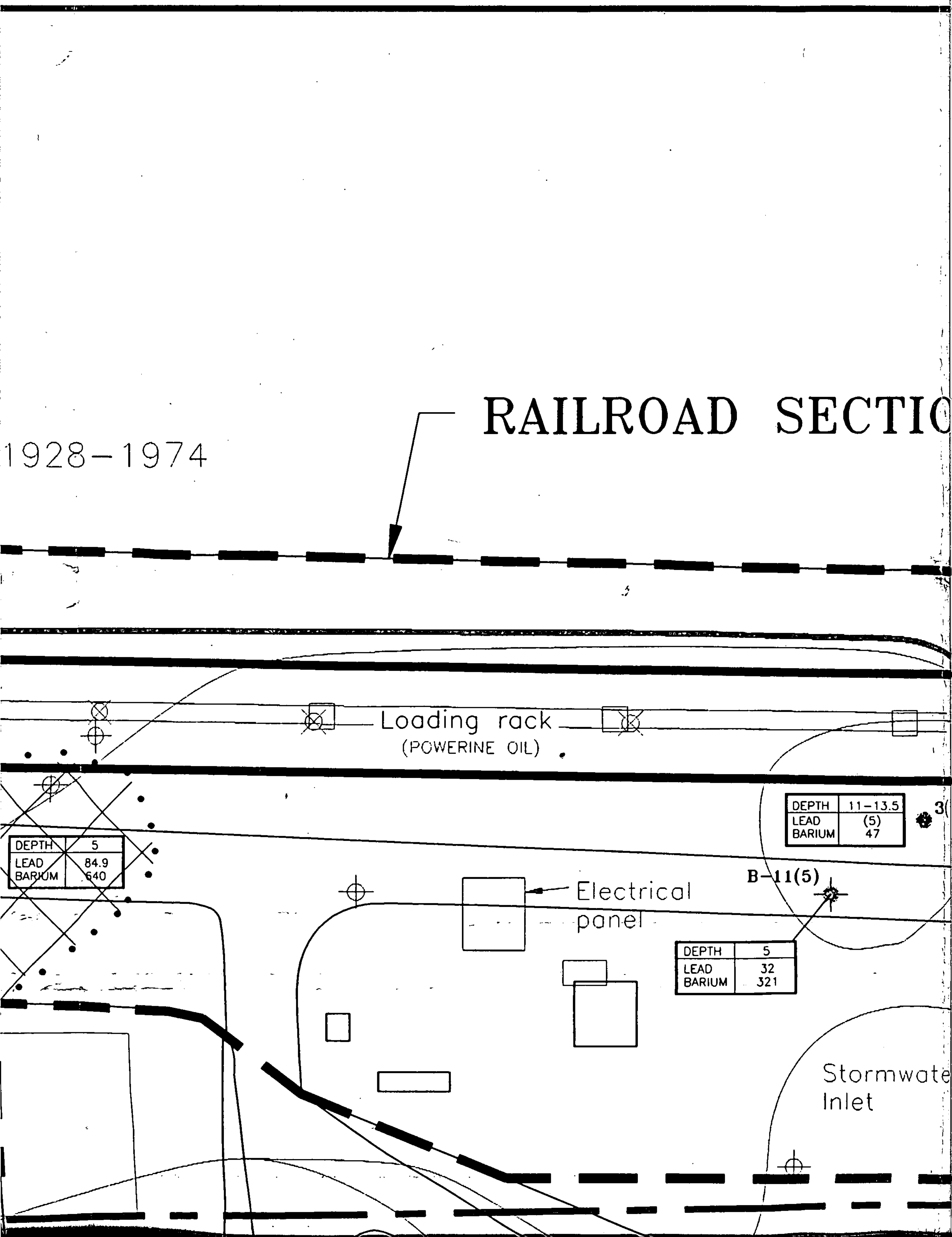
32 shallow trenches
(total depths approx
with sample loc

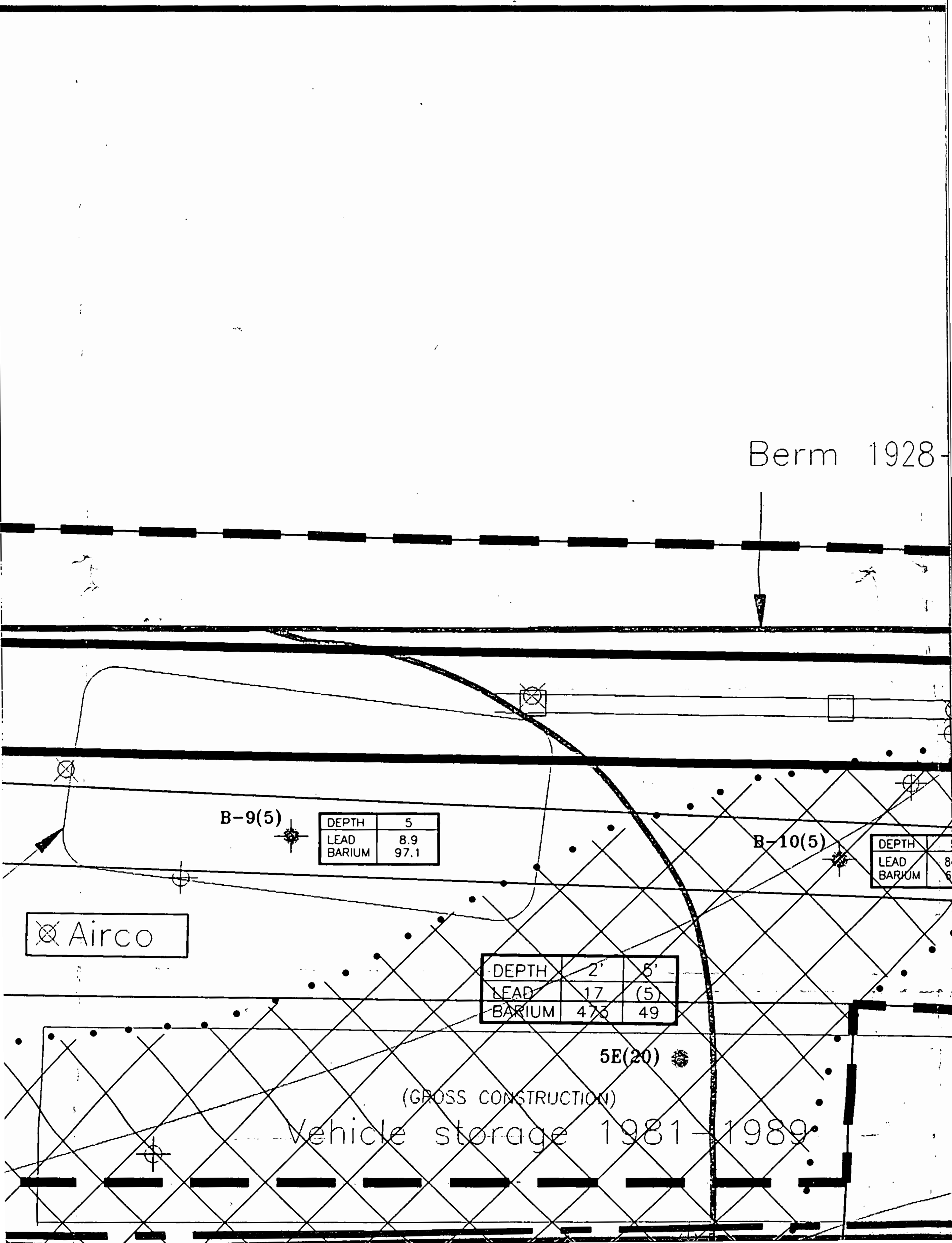
16 shallow trenches
with sample loc

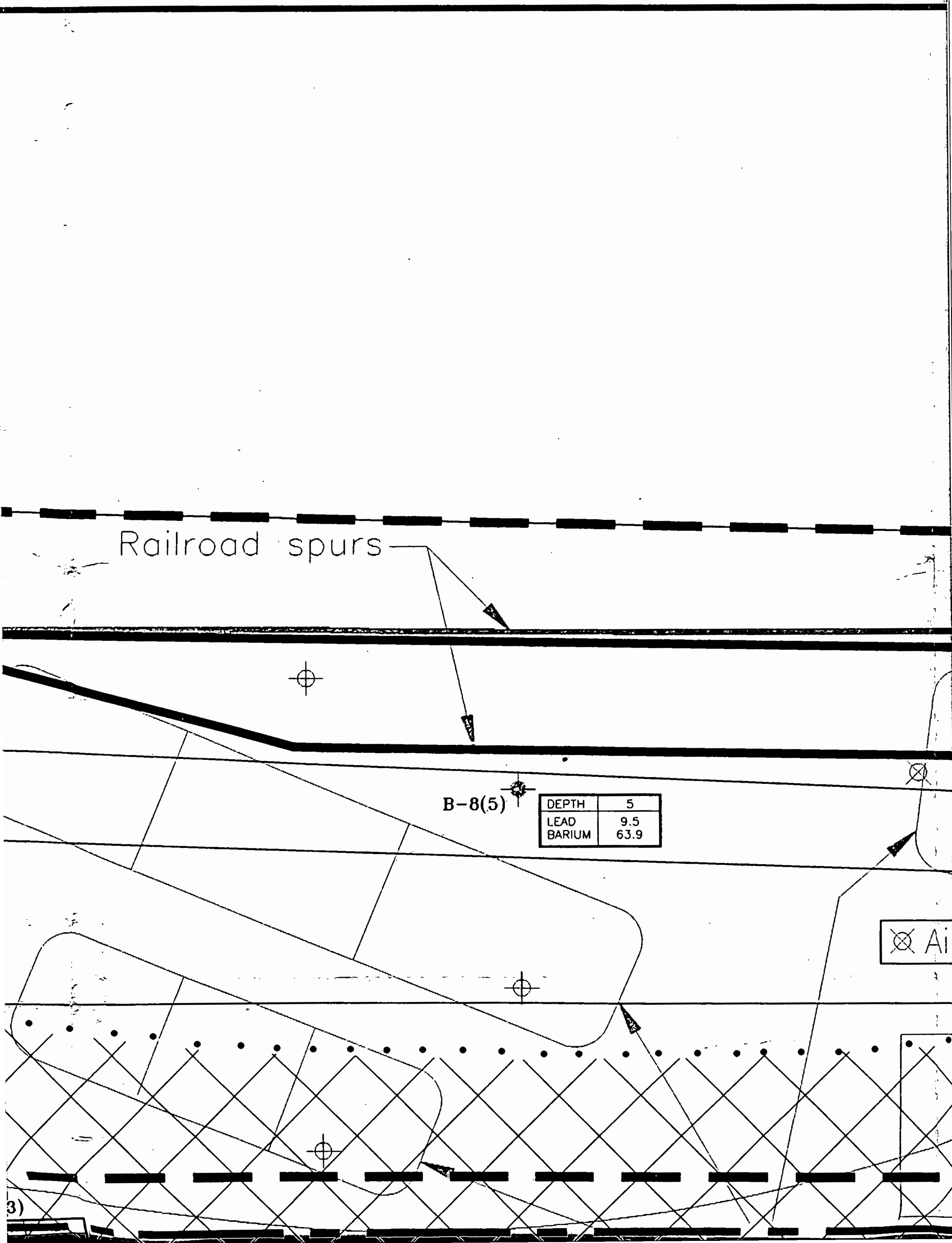
Probable extent of
greater than 10 mg

CTION

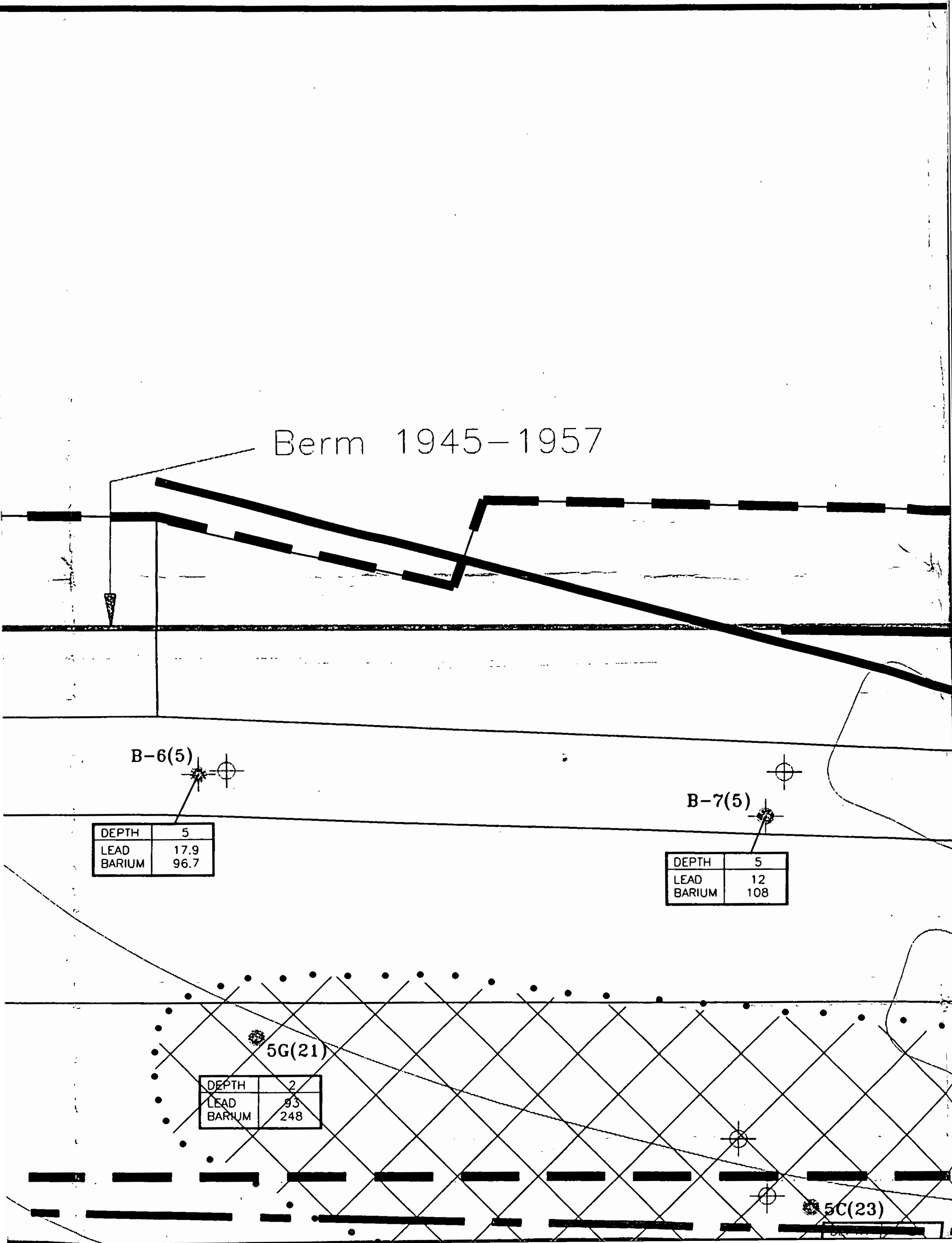



RAILROAD SECTIO
1928-1974
Loading rack
(POWERINE OIL)
DEPTH 5
LEAD 84.9
BARIUM 640
DEPTH 11-13.5
LEAD (5)
BARIUM 47
3(
B-11(5)
Electrical
panel
DEPTH 5
LEAD 32
BARIUM 321
Stormwate
Inlet

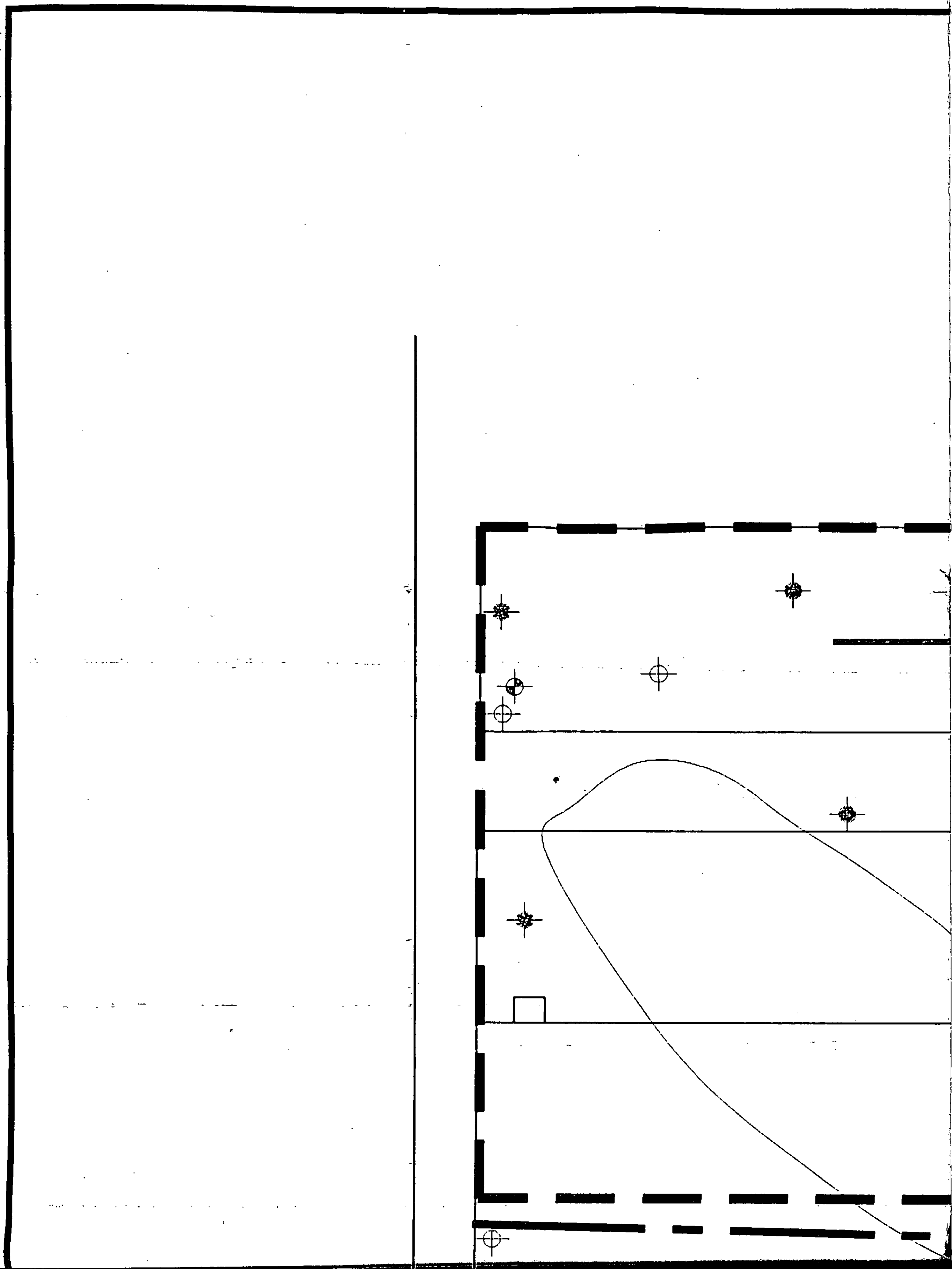

Berm 1928-
B-9(5)
DEPTH 5
LEAD 8.9
BARIUM 97.1
B-10(5)
DEPTH
LEAD
BARIUM
Airco
DEPTH 2' 5'
LEAD 17 (5)
BARIUM 473 49
5E(20)
(GROSS CONSTRUCTION)
Vehicle storage 1981-1989

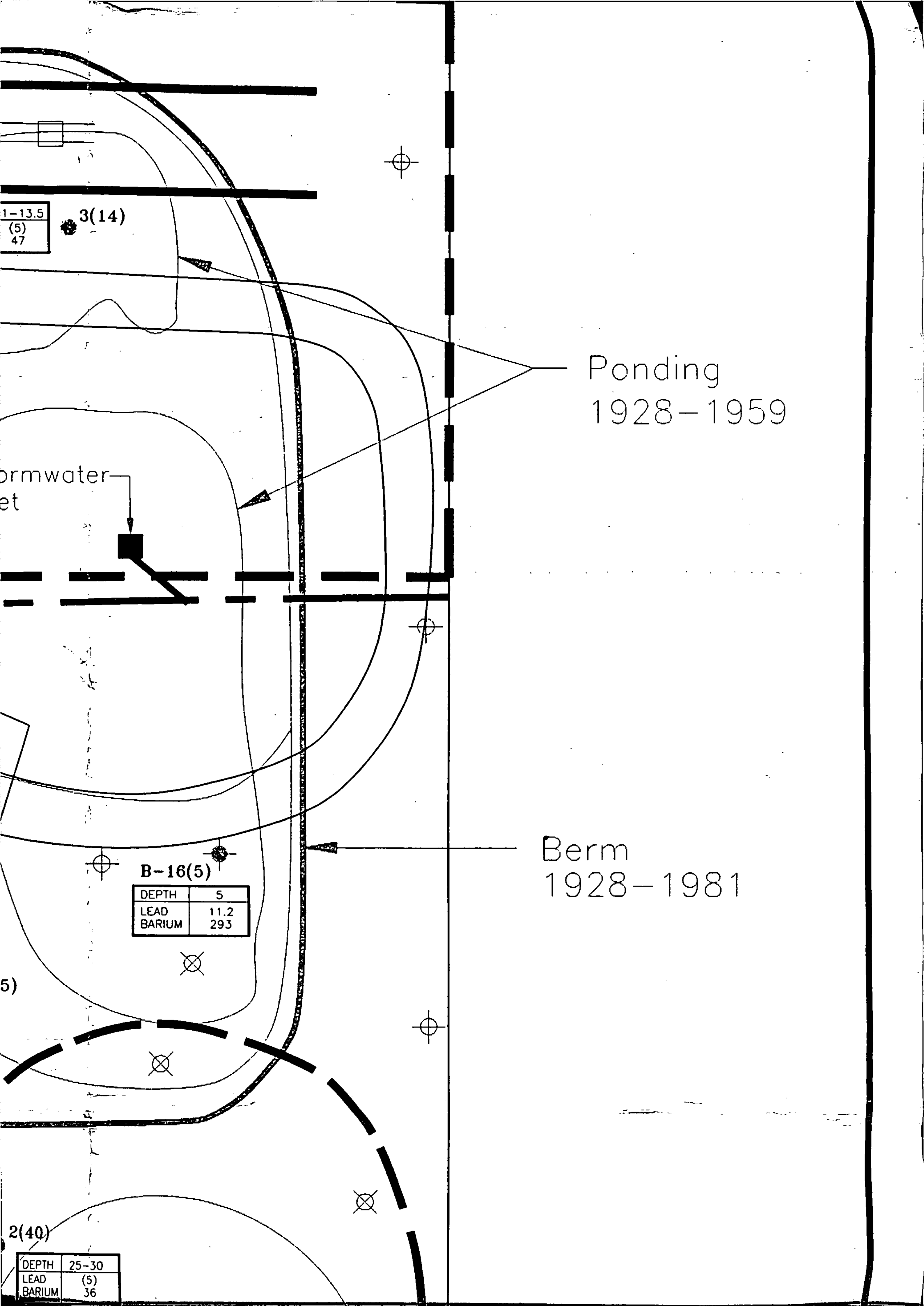


Railroad spurs
B-8(5)
DEPTH 5
LEAD 9.5
BARIUM 63.9
Ai
3)

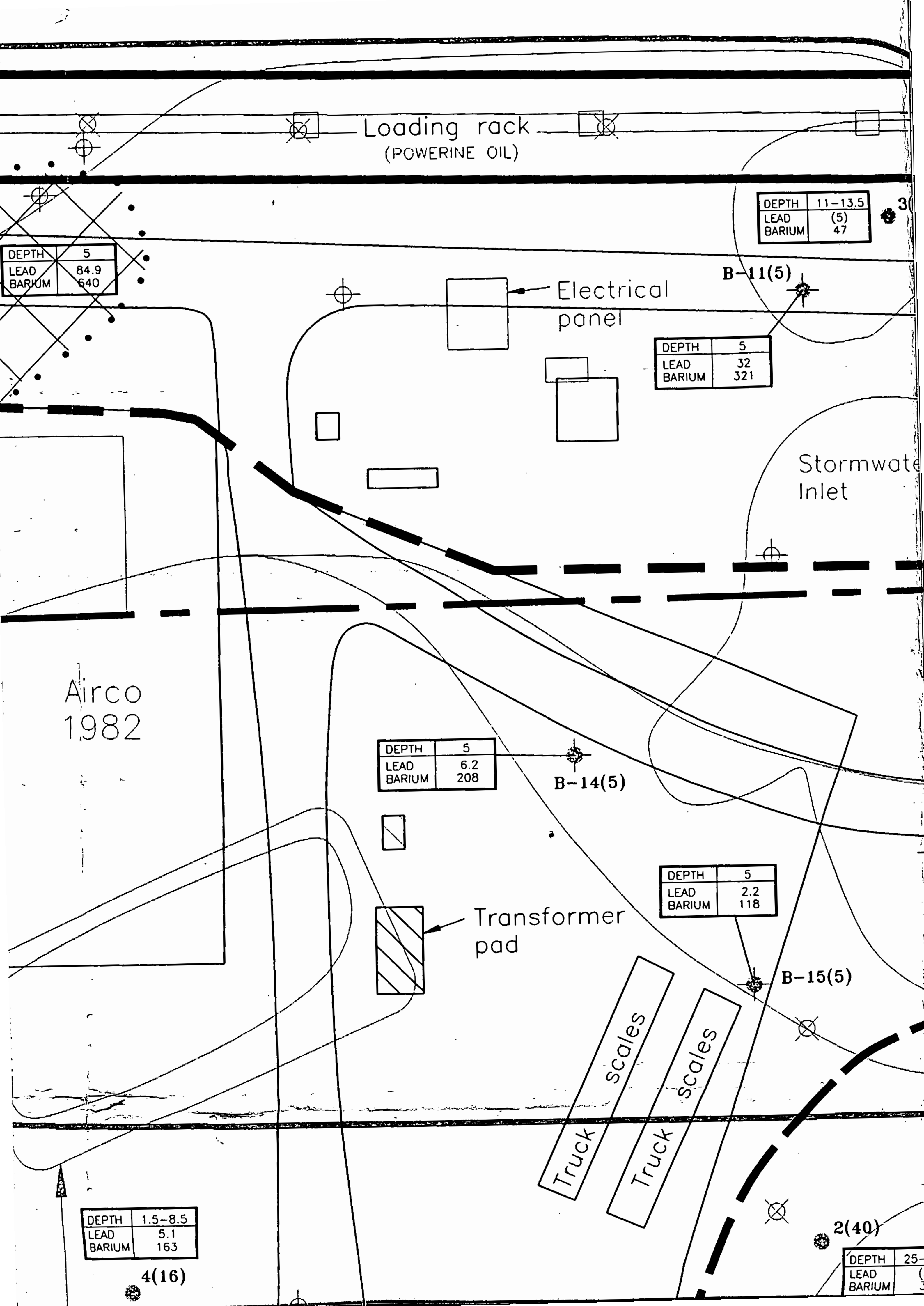

Berm 1945–1957
B-6(5)
DEPTH 5
LEAD 17.9
BARIUM 96.7
B-7(5)
DEPTH 5
LEAD 12
BARIUM 108
5G(21)
DEPTH 2
LEAD 93
BARIUM 248
5C(23)

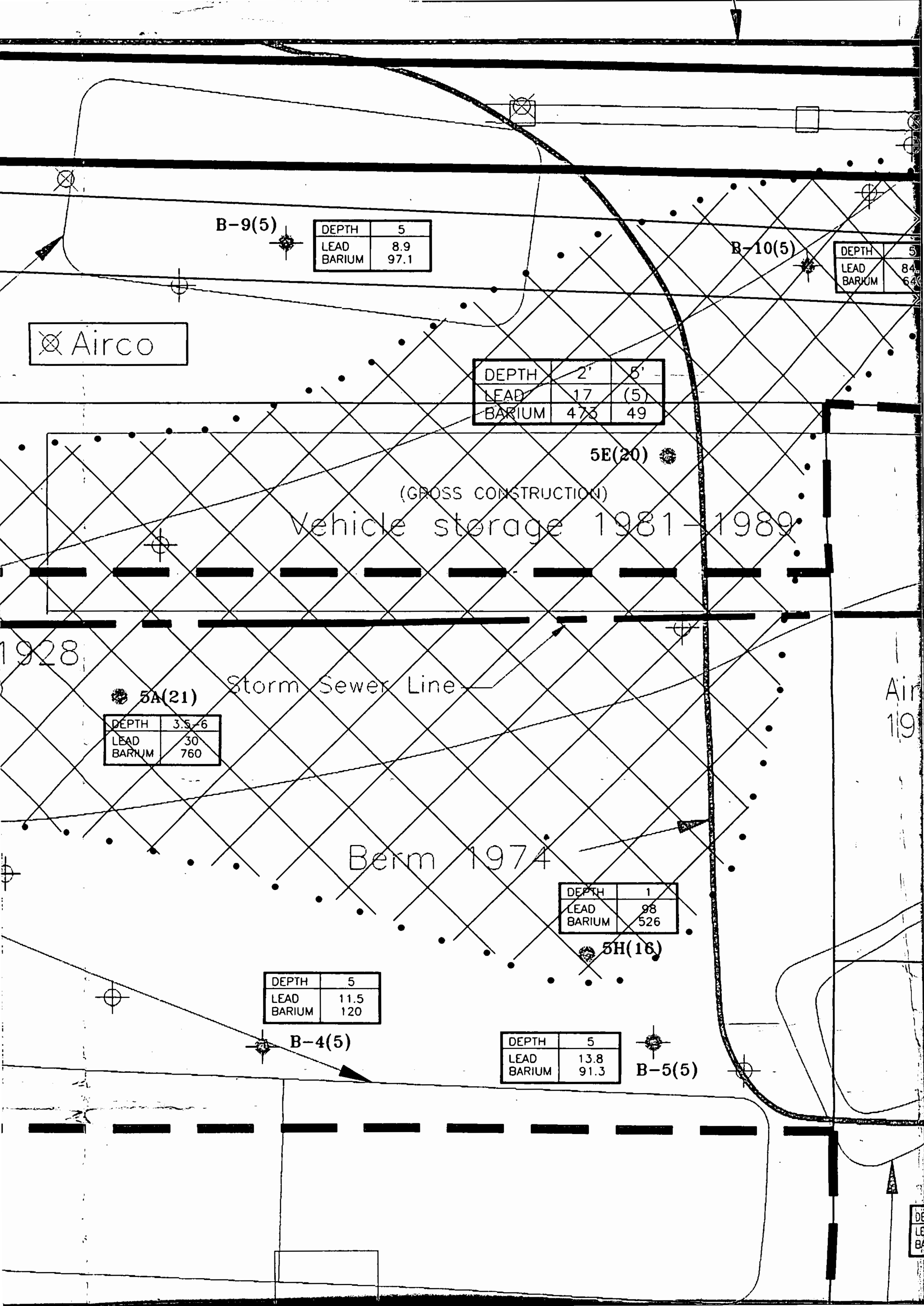
USER1 HDL\22263\2\S1A

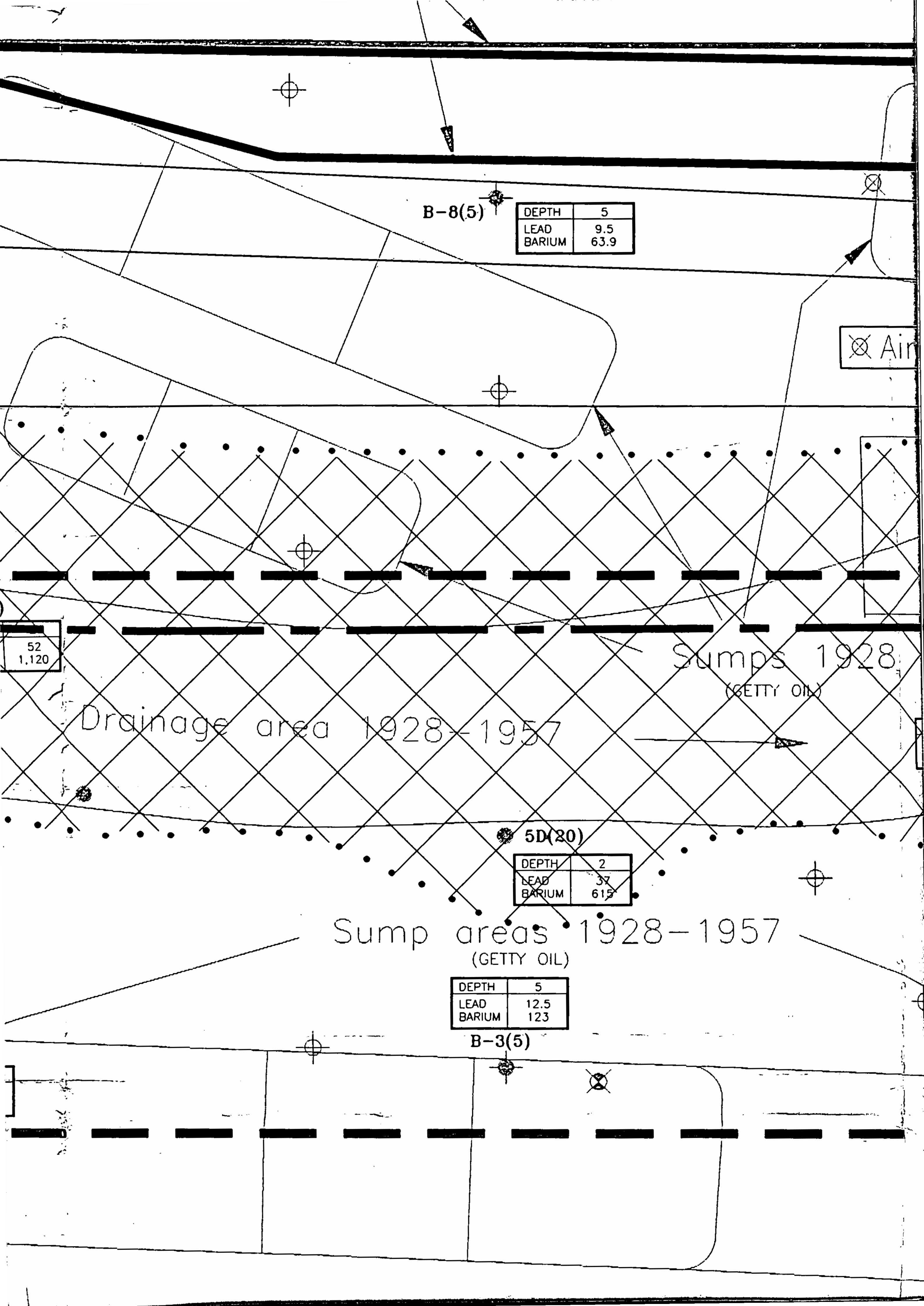




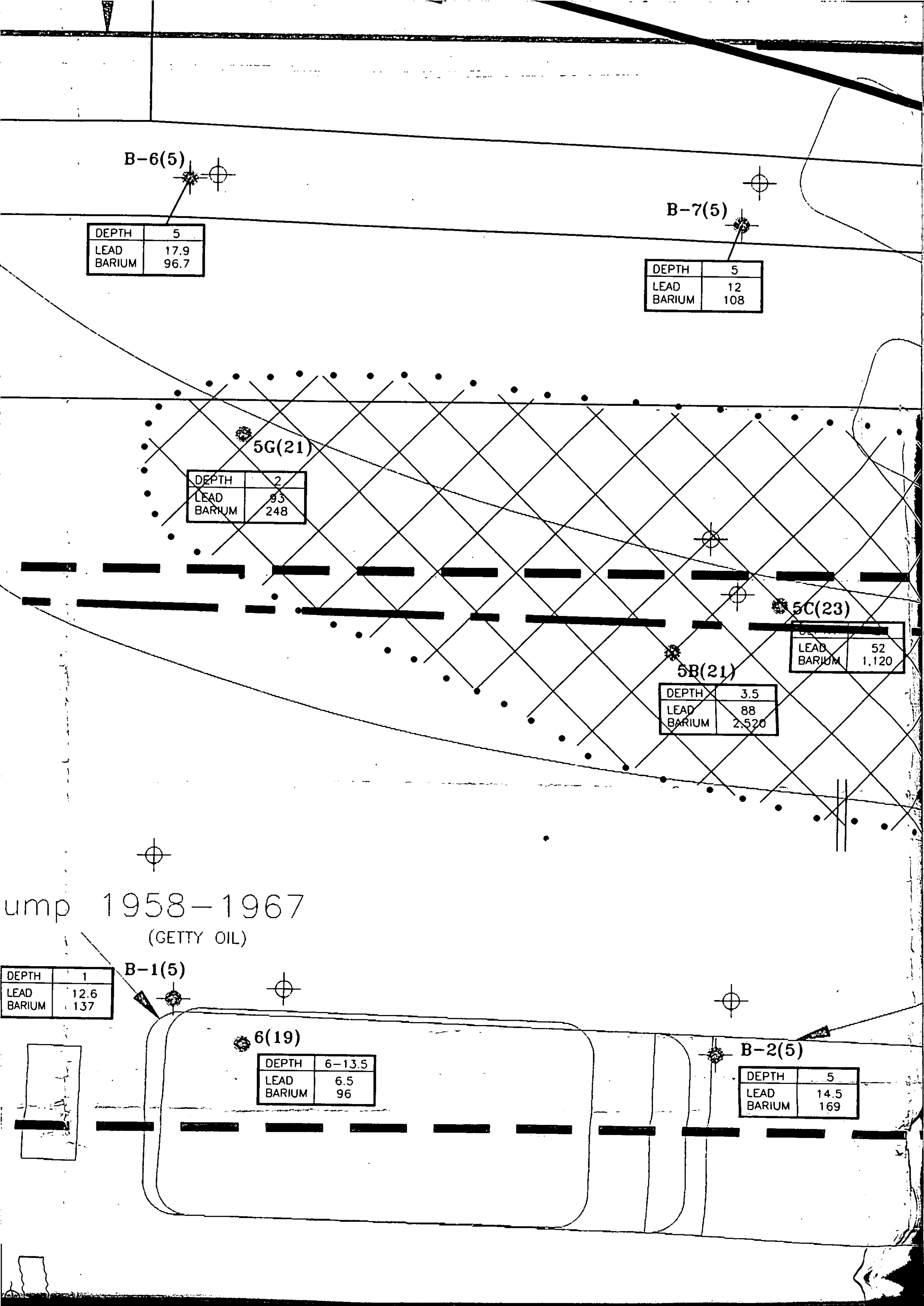
1-13.5
(5)
47
3(14)
Ponding
1928-1959
ormwater
et
Berm
1928-1981
B-16(5)
DEPTH 5
LEAD 11.2
BARIUM 293
5)
2(40)
DEPTH 25-30
LEAD (5)
BARIUM 36

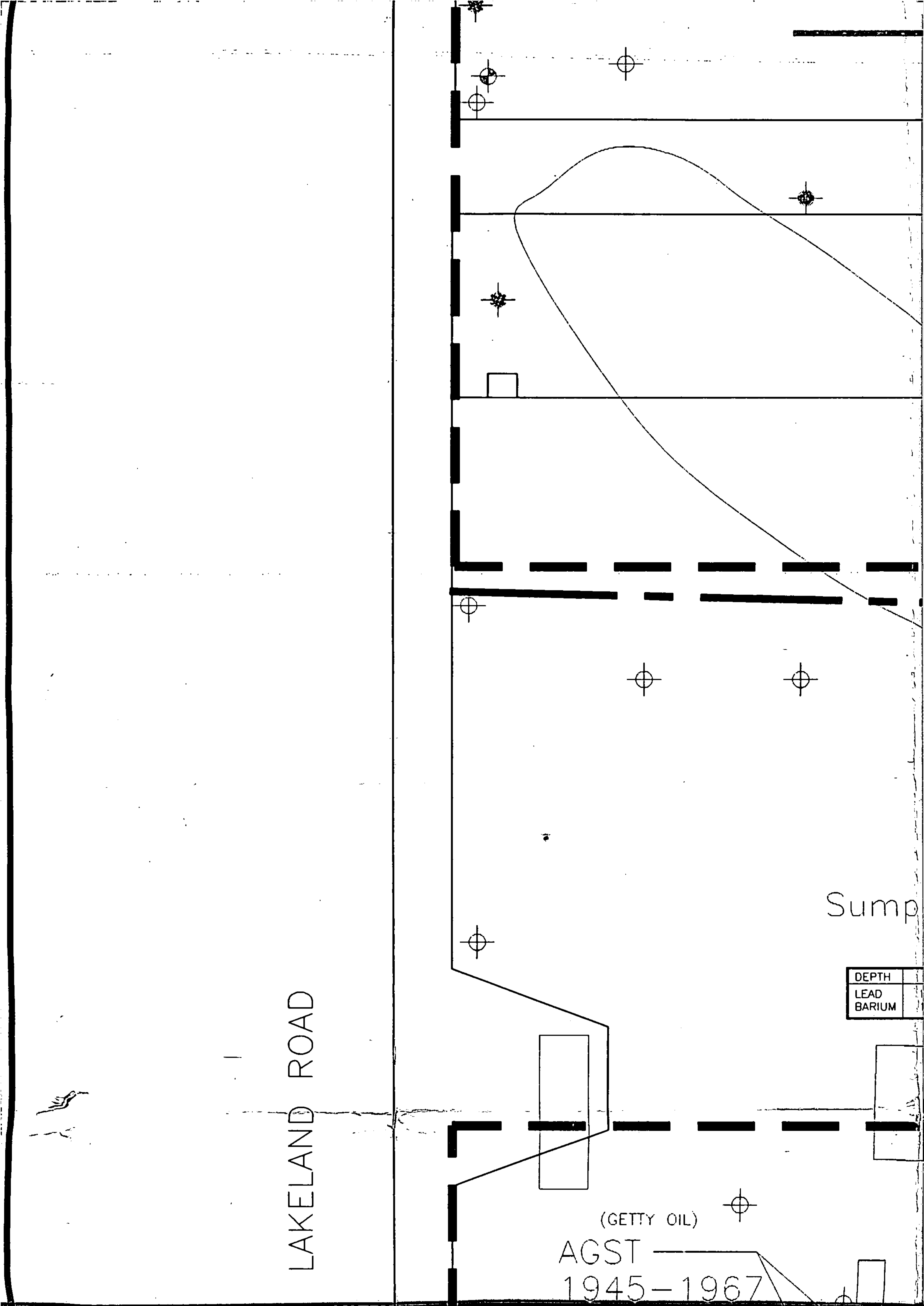

Loading rack
(POWERINE OIL)
DEPTH 5
LEAD 84.9
BARIUM 640
DEPTH 11-13.5
LEAD (5)
BARIUM 47
B-11(5)
Electrical panel
DEPTH 5
LEAD 32
BARIUM 321
Stormwate
Inlet
Airco
1982
DEPTH 5
LEAD 6.2
BARIUM 208
B-14(5)
DEPTH 5
LEAD 2.2
BARIUM 118
Transformer pad
B-15(5)
Truck scales
Truck scales
DEPTH 1.5-8.5
LEAD 5.1
BARIUM 163
4(16)
2(40)
DEPTH 25-
LEAD
BARIUM

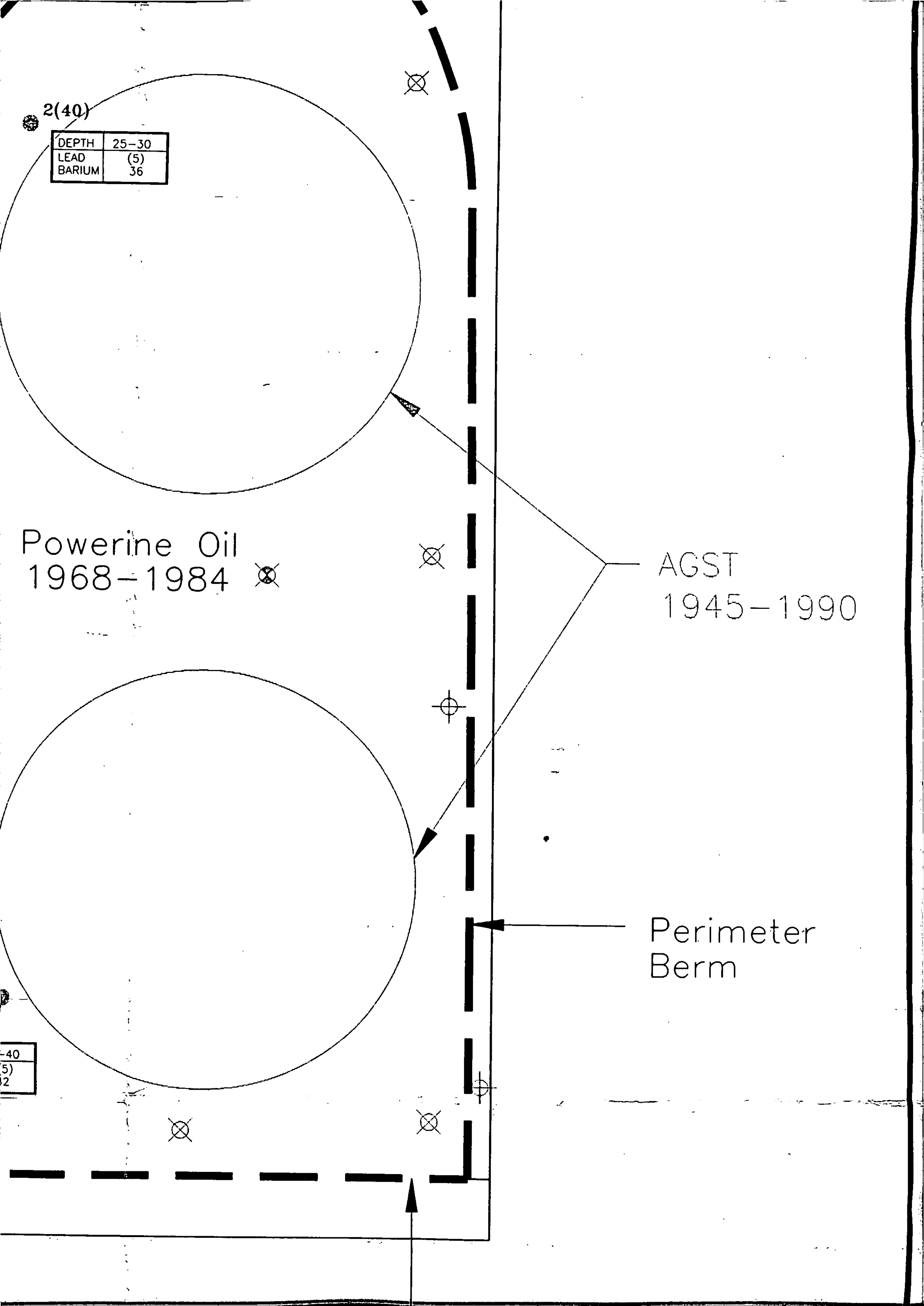

B-9(5)
DEPTH 5
LEAD 8.9
BARIUM 97.1
Airco
B-10(5)
DEPTH
LEAD
BARIUM
DEPTH 2' 5'
LEAD 17 (5)
BARIUM 473 49
5E(20)
(GROSS CONSTRUCTION)
Vehicle storage 1981-1989
1928
Storm Sewer Line
5A(21)
DEPTH 3.5-6
LEAD 30
BARIUM 760
Berm 1974
DEPTH 1
LEAD 98
BARIUM 526
5H(16)
DEPTH 5
LEAD 11.5
BARIUM 120
B-4(5)
DEPTH 5
LEAD 13.8
BARIUM 91.3
B-5(5)

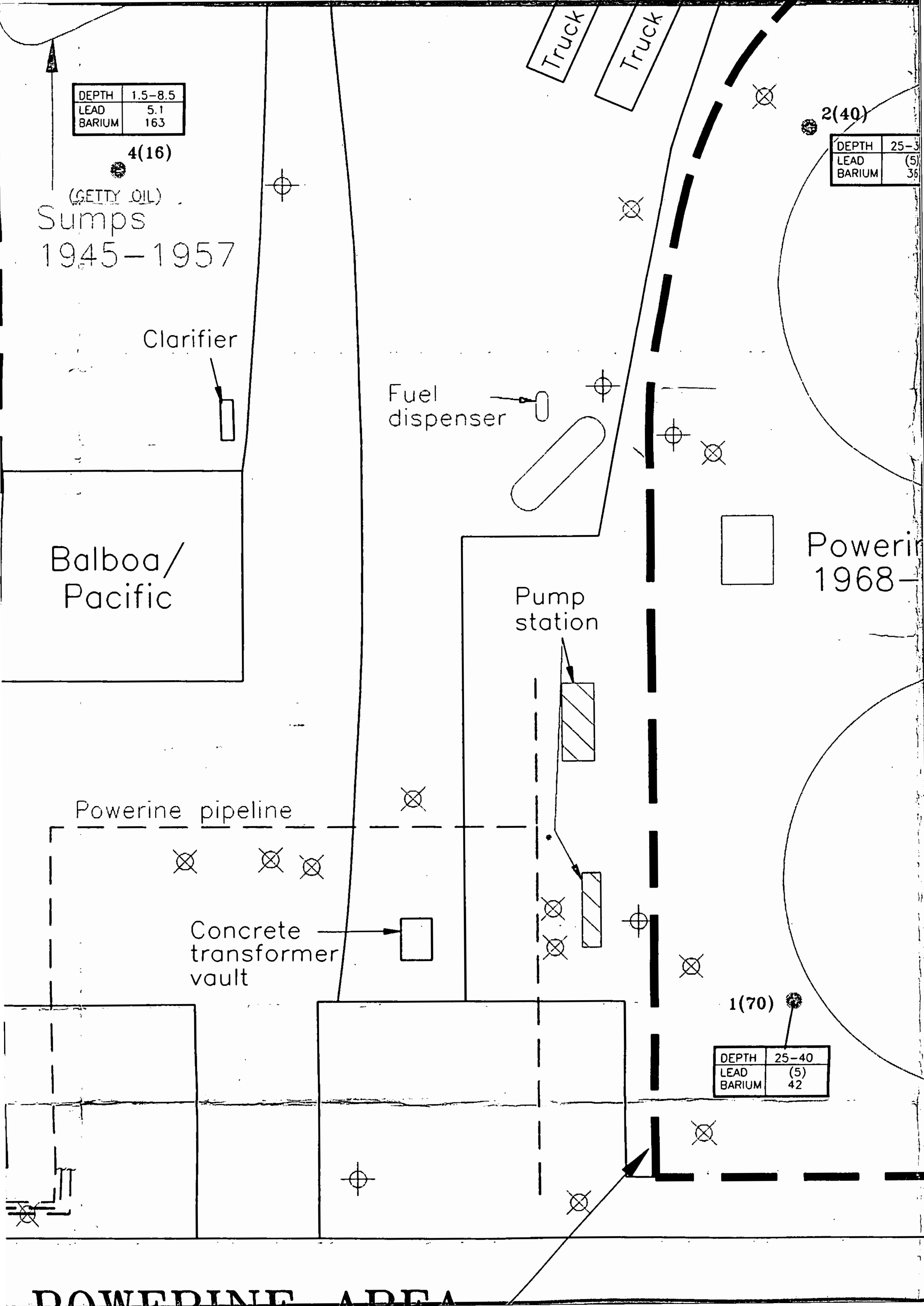


B-8(5)
DEPTH 5
LEAD 9.5
BARIUM 63.9
Air
52
1,120
Sumps 1928
(GETTY OIL)
Drainage area 1928-1957
5D(20)
DEPTH 2
LEAD 37
BARIUM 615
Sump areas 1928-1957
(GETTY OIL)
DEPTH 5
LEAD 12.5
BARIUM 123
B-3(5)

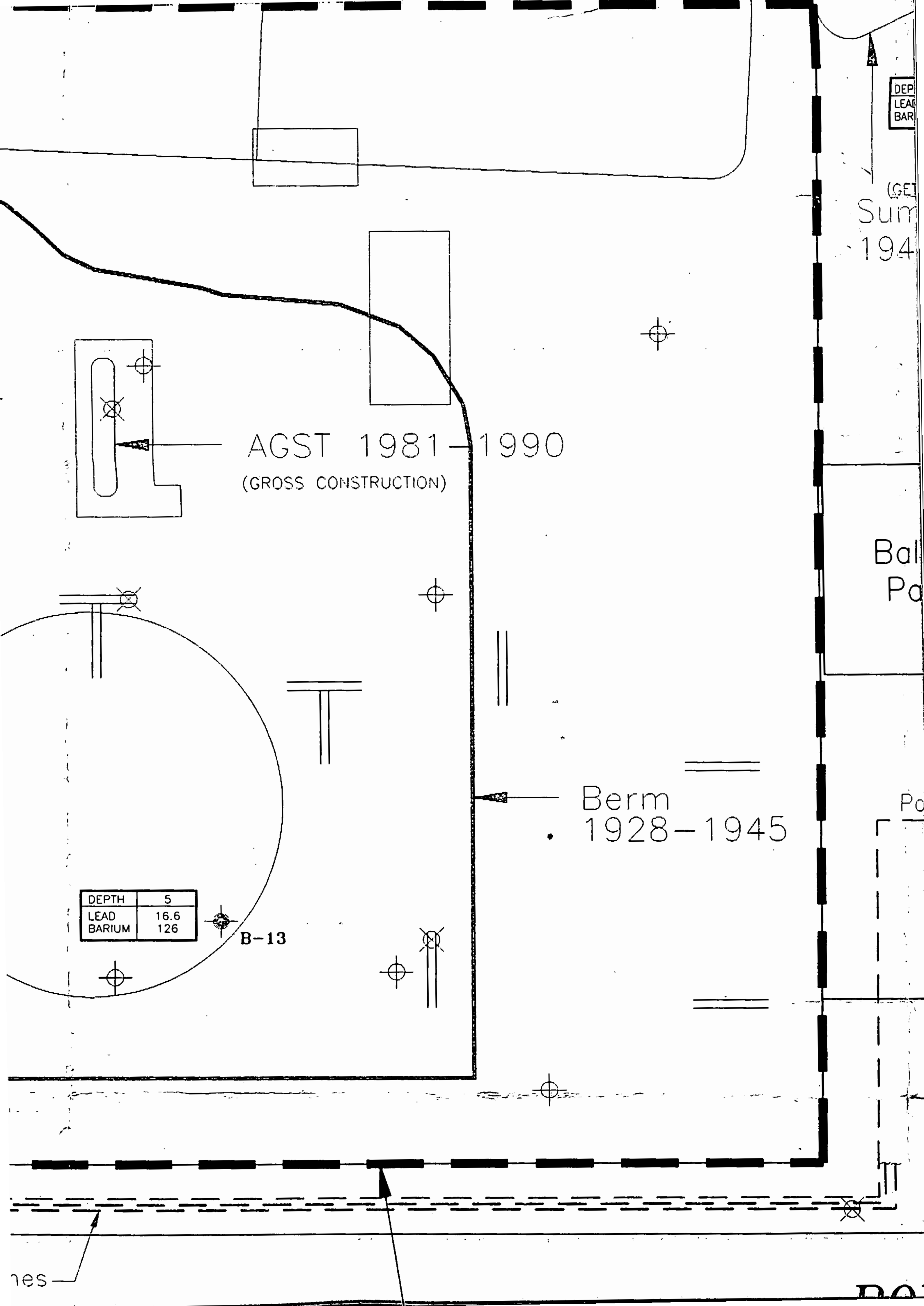

B-6(5)
DEPTH 5
LEAD 17.9
BARIUM 96.7
B-7(5)
DEPTH 5
LEAD 12
BARIUM 108
5G(21)
DEPTH 2
LEAD 93
BARIUM 248
5C(23)
LEAD 52
BARIUM 1,120
5B(21)
DEPTH 3.5
LEAD 88
BARIUM 2,520
ump 1958-1967
(GETTY OIL)
DEPTH 1
LEAD 12.6
BARIUM 137
B-1(5)
6(19)
DEPTH 6-13.5
LEAD 6.5
BARIUM 96
B-2(5)
DEPTH 5
LEAD 14.5
BARIUM 169

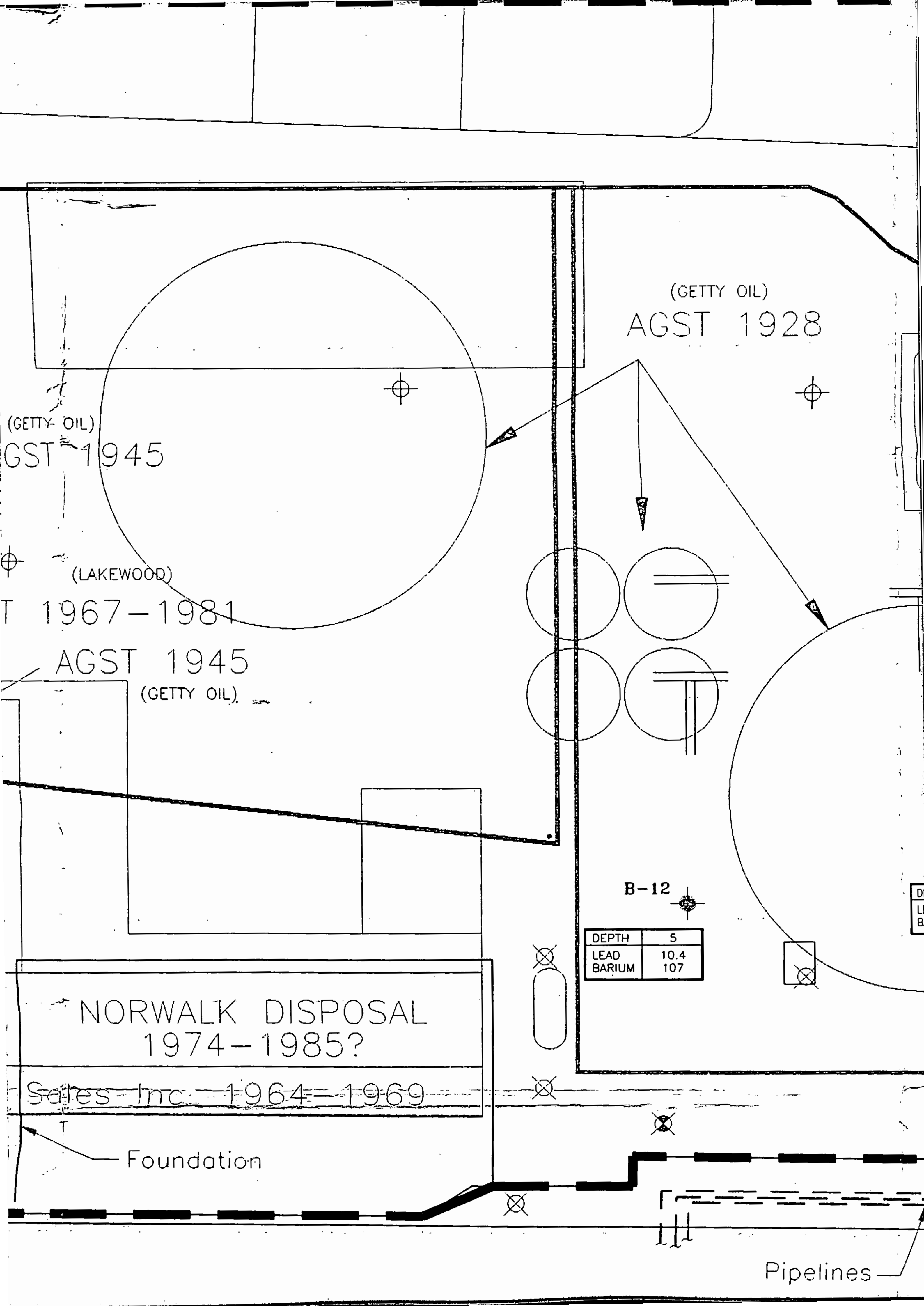

LAKELAND ROAD
Sump
DEPTH
LEAD
BARIUM
(GETTY OIL)
AGST
1945–1967

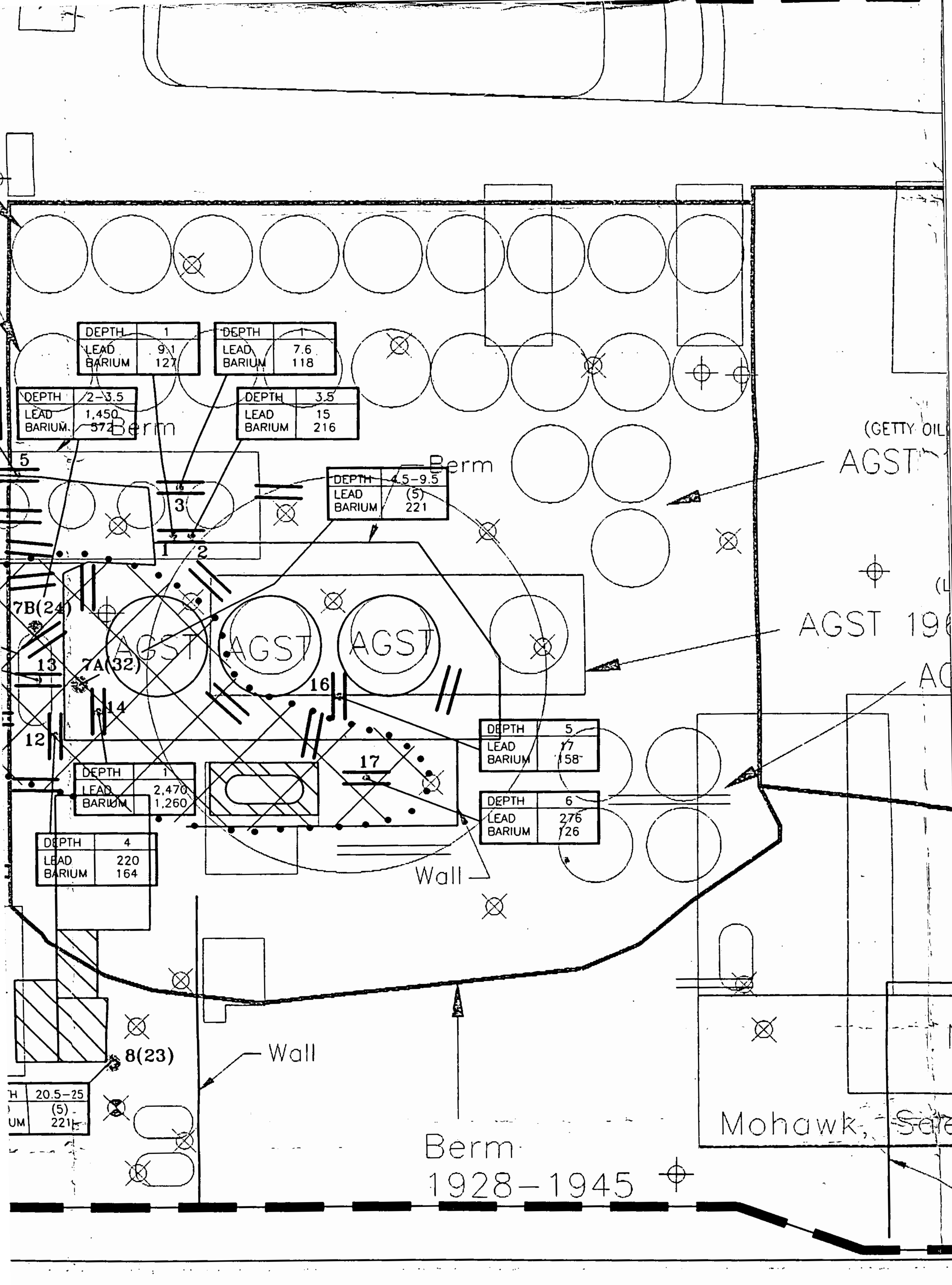

2(40)
DEPTH 25-30
LEAD (5)
BARIUM 36
Powerine Oil
1968-1984
AGST
1945-1990
Perimeter
Berm



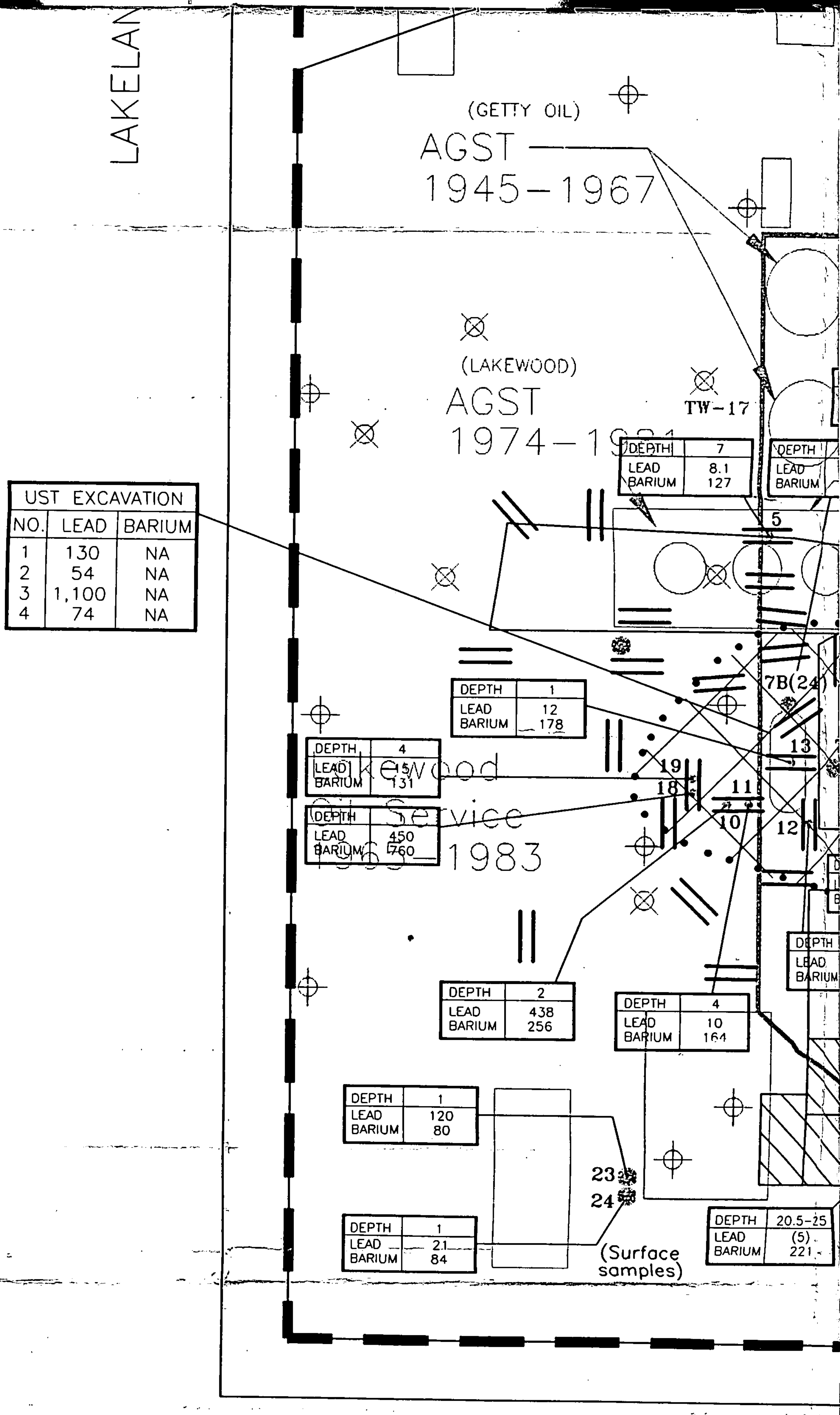
DEPTH 1.5–8.5
LEAD 5.1
BARIUM 163
4(16)
(GETTY OIL)
Sumps
1945–1957
Truck
Truck
2(40)
DEPTH 25–3
LEAD (5)
BARIUM 36
Clarifier
Fuel
dispenser
Balboa/
Pacific
Powerin
1968–
Pump
station
Powerine pipeline
Concrete
transformer
vault
1(70)
DEPTH 25–40
LEAD (5)
BARIUM 42
POWERINE AREA


AGST 1981–1990
(GROSS CONSTRUCTION)
Berm
1928–1945
DEPTH 5
LEAD 16.6
BARIUM 126
B-13
Sum
194
Bal
Pa
Po
DEP
LEA
BAR
nes

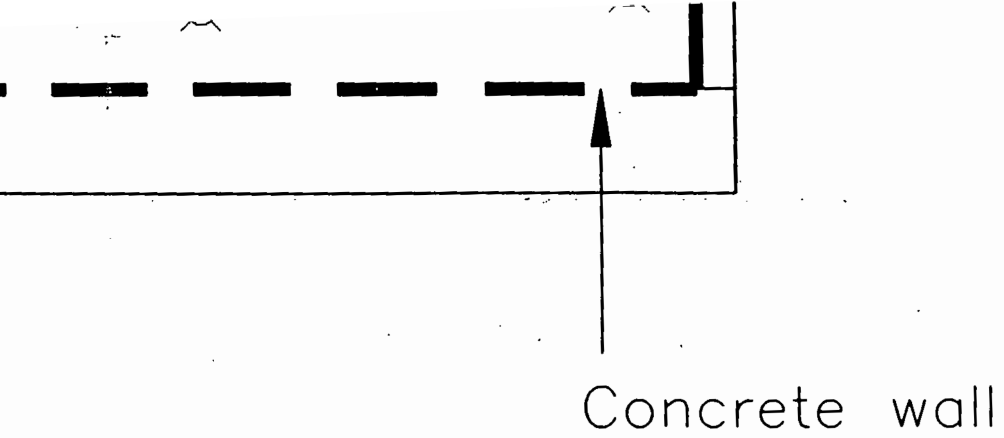

(GETTY OIL)
AGST 1928
(GETTY OIL)
GST 1945
(LAKEWOOD)
T 1967–1981
AGST 1945
(GETTY OIL)
B-12
DEPTH 5
LEAD 10.4
BARIUM 107
NORWALK DISPOSAL
1974–1985?
Sales Inc. 1964–1969
Foundation
Pipelines



DEPTH 1
LEAD 9.1
BARIUM 127
DEPTH 1
LEAD 7.6
BARIUM 118
DEPTH 2-3.5
LEAD 1,450
BARIUM 572
DEPTH 3.5
LEAD 15
BARIUM 216
Berm
(GETTY OIL
AGST
DEPTH 4.5-9.5
LEAD (5)
BARIUM 221
Berm
5
3
1
2
7B(24)
13
7A(32)
AGST
AGST
AGST
AGST 19
16
14
12
DEPTH 5
LEAD 17
BARIUM 158
DEPTH 1
LEAD 2,470
BARIUM 1,260
17
DEPTH 6
LEAD 276
BARIUM 126
DEPTH 4
LEAD 220
BARIUM 164
Wall
8(23)
Wall
20.5-25
(5)
221
Berm
1928-1945
Mohawk,



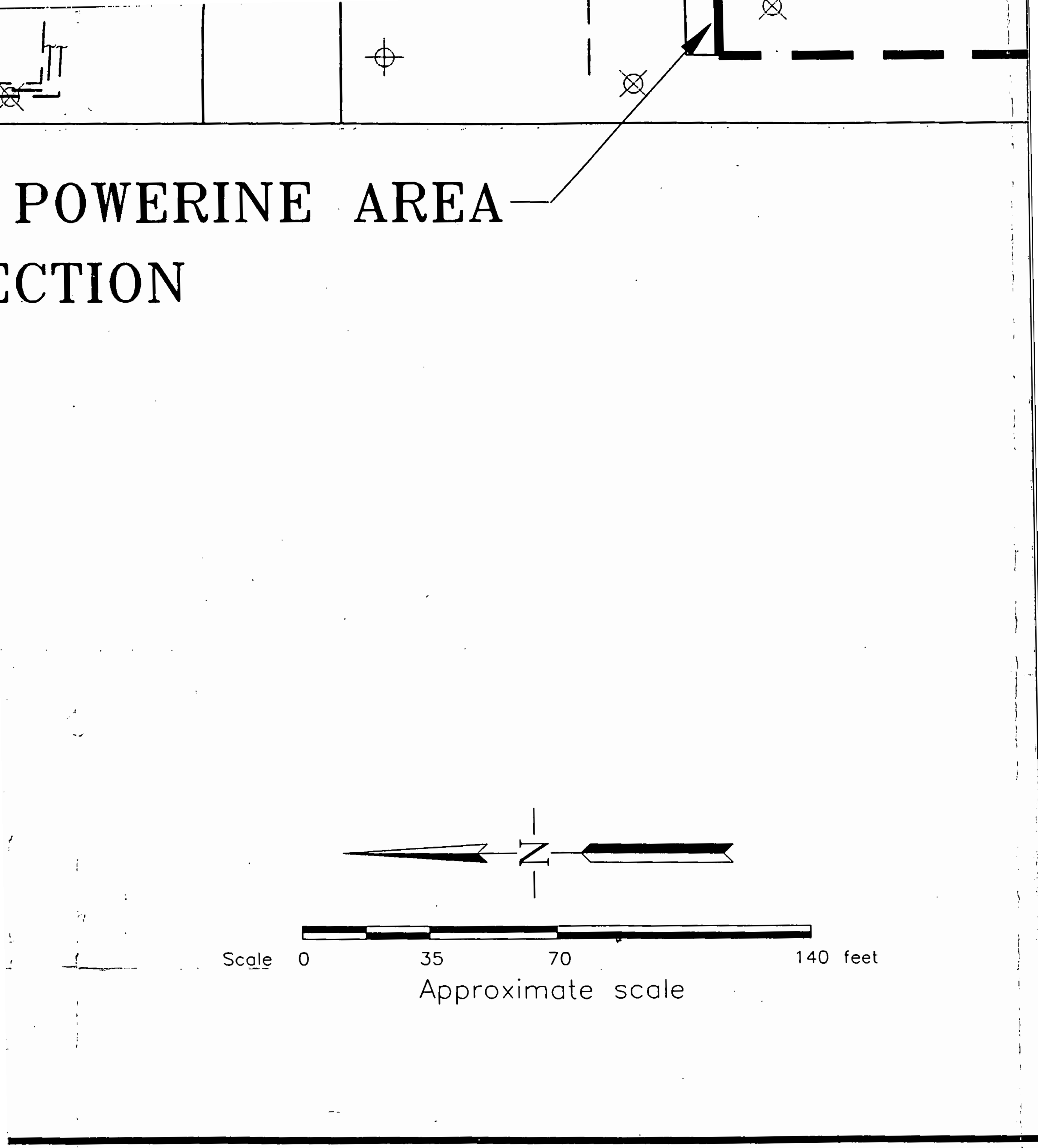
EXPLANANTION



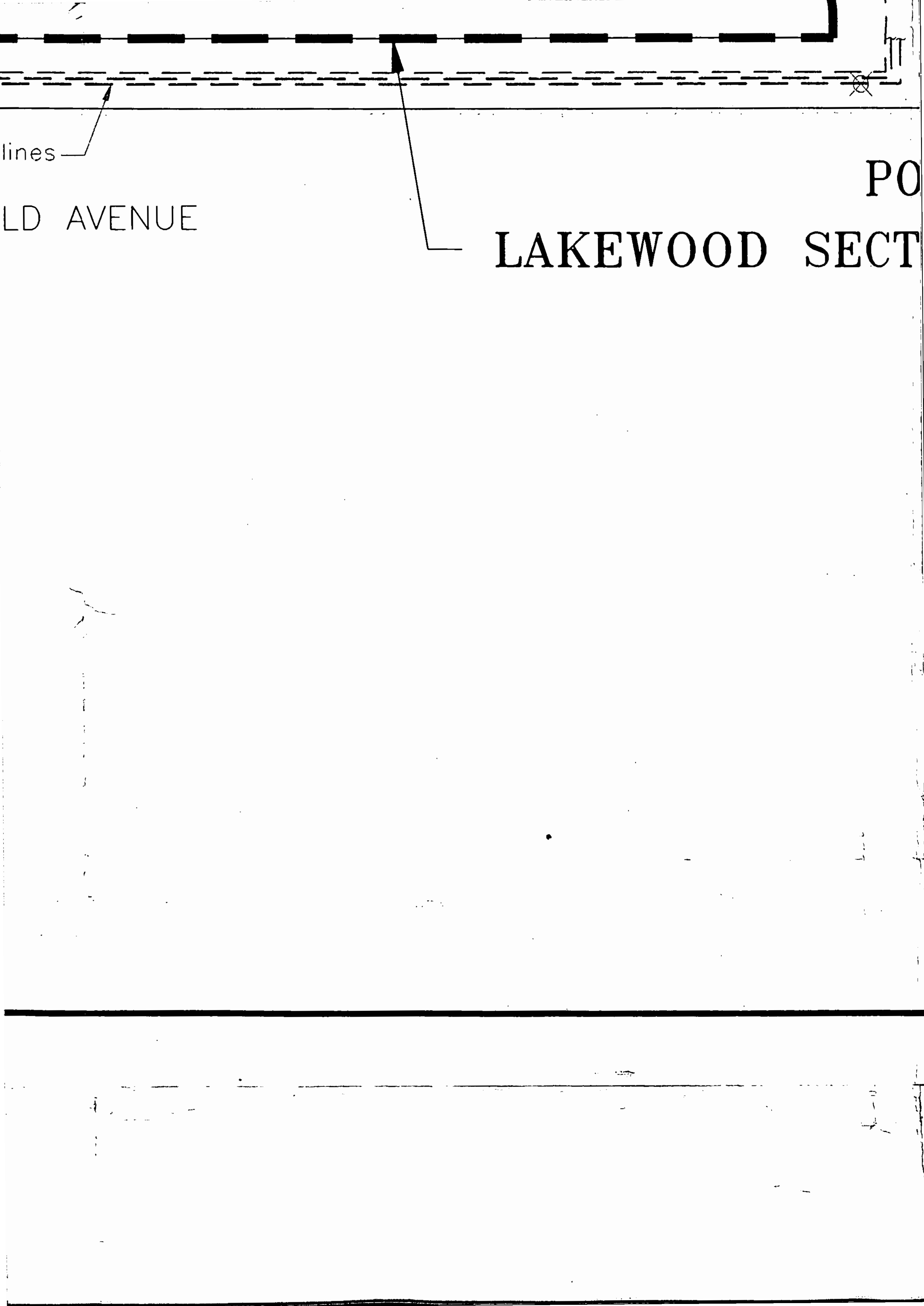
Harding Lawson Associates
Engineering and Environmental Services

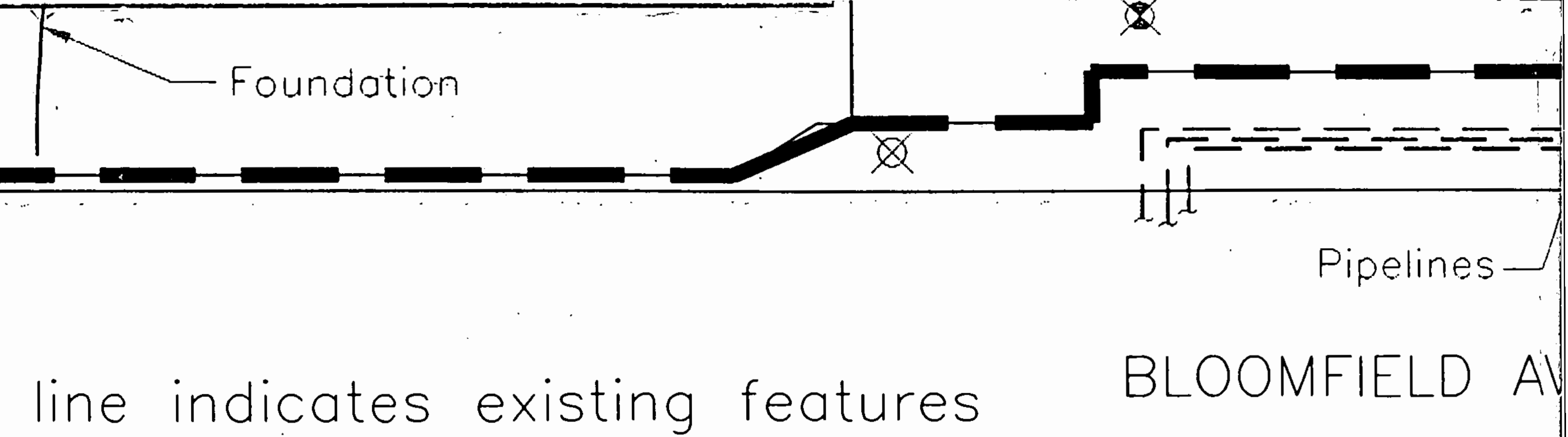
3 Hutton Centre Drive
Suite 300
Santa Ana, CA 92707

HLA PROJECT NUMBER 22263-2	CLIENT NAME TEXACO, INC.	
DRAWN BY: LJH — DATE 2/93 CHECKED BY: DWC — DATE 4/93 APPROVED BY: DATE HLA: DWC 4/93 CLIENT:	DRAWING TITLE **EXISTING METALS DATA** Walker Property Site Santa Fe Springs, California	PLATE **7b**
	SCALE 1" = 100'	



POWERINE AREA
CTION
N
Scale 0 35 70 140 feet
Approximate scale


lines
LD AVENUE
PO
LAKEWOOD SECT



line indicates existing features

line indicates previous features

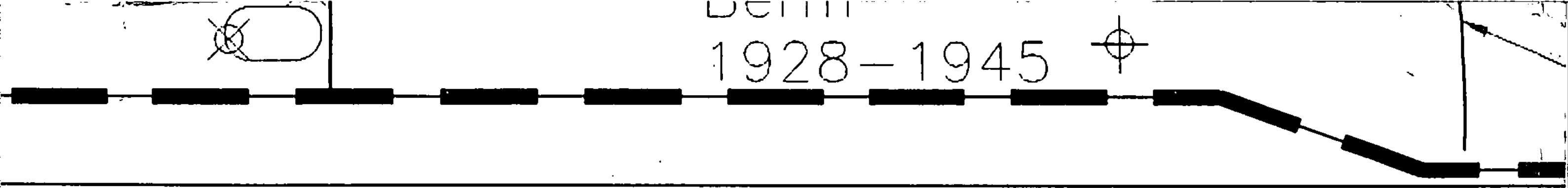
wash–down sump

rete pad

concentrations in milligrams
ogram (mg/kg)

in feet

ed sample locations not analyzed
tals



re soil boring
boring)

ng
boring)

ytical vapor well

ches by Dames and Moore
location

ches by TRC
location

ited lead or barium concentrations

Black line

Gray line

Truck was

Concrete

NOTES

Metal conce
per kilogram

Depths in fe

Unlabeled sa
for metals

EXPLANANTION

6(19) Dames and Moore s
(total depth of bori

B-2(5) EMCON soil boring
(total depth of bori

EMCON well

Geoscience Analytica

TRC soil boring

TRC well

32 shallow trenches

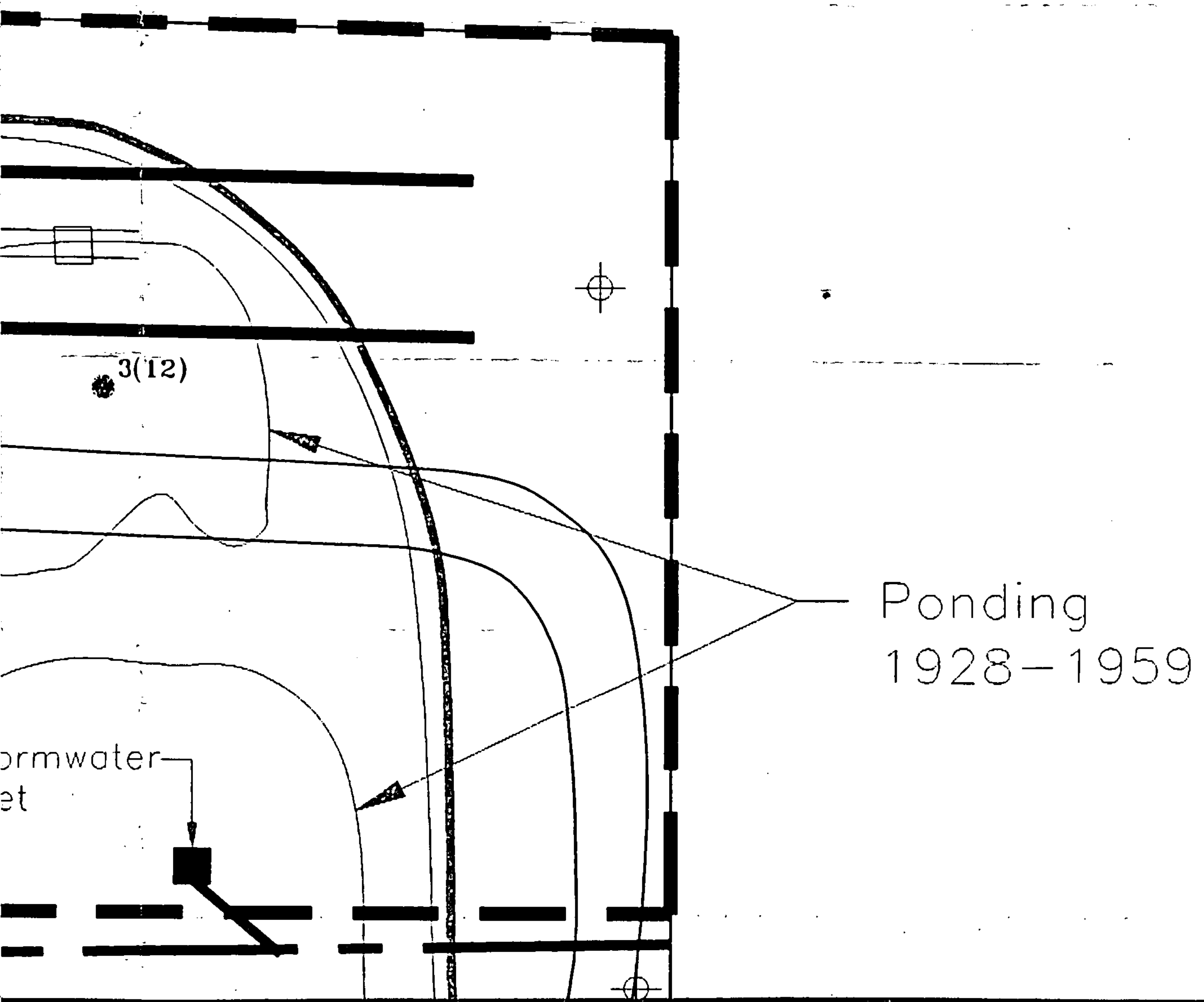
with sample loc

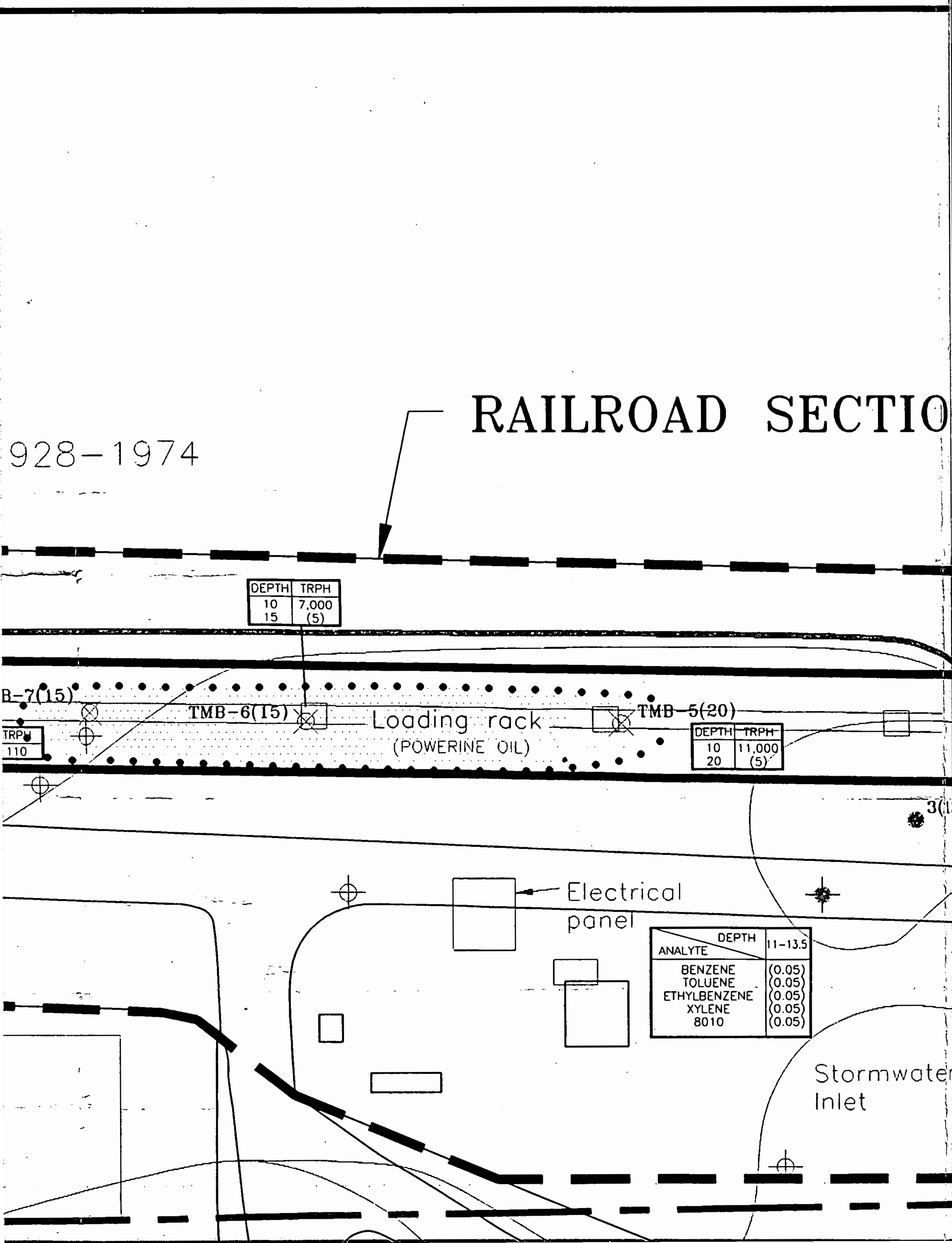
16 shallow trenches

with sample loc

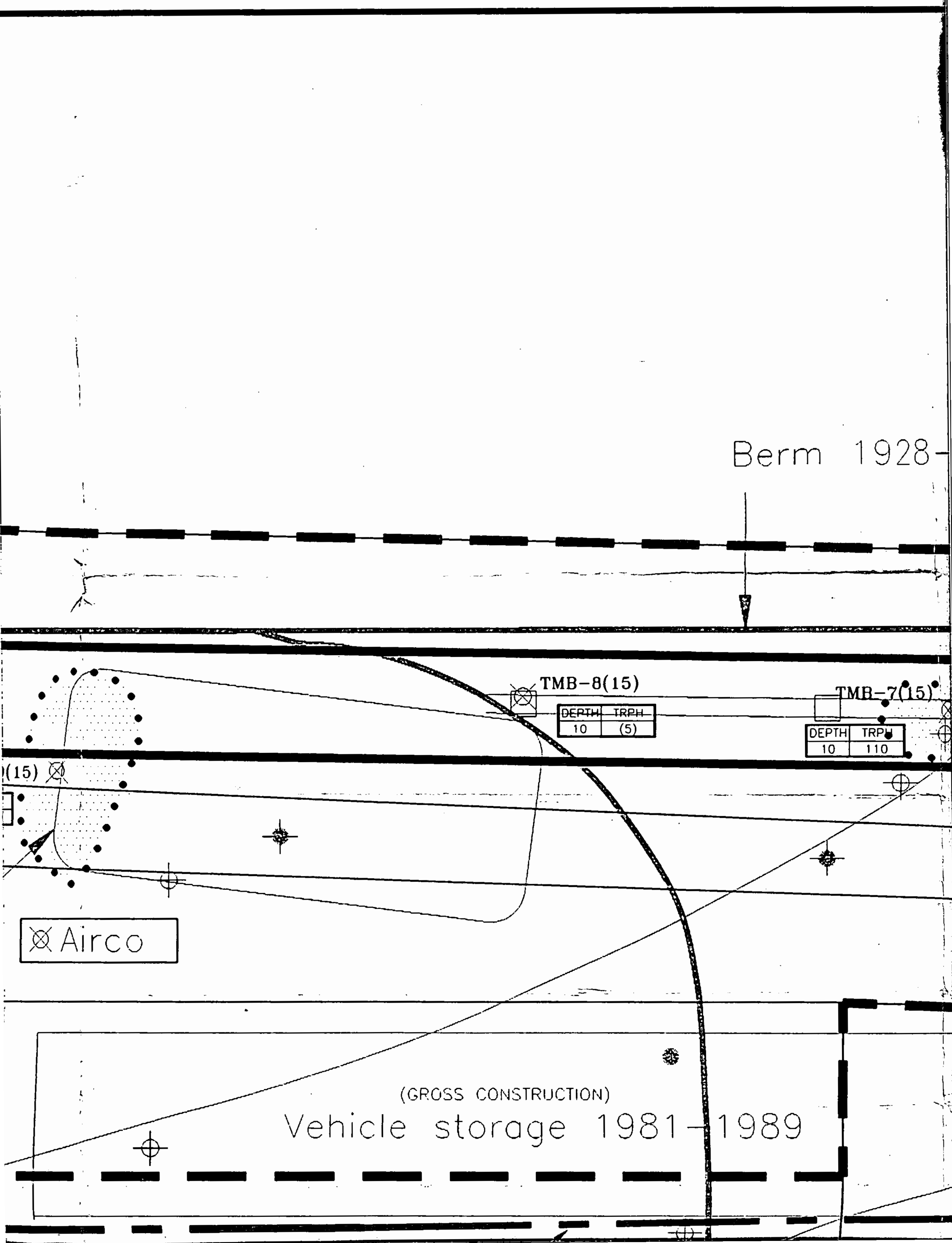
Areas with elevated

ːTION

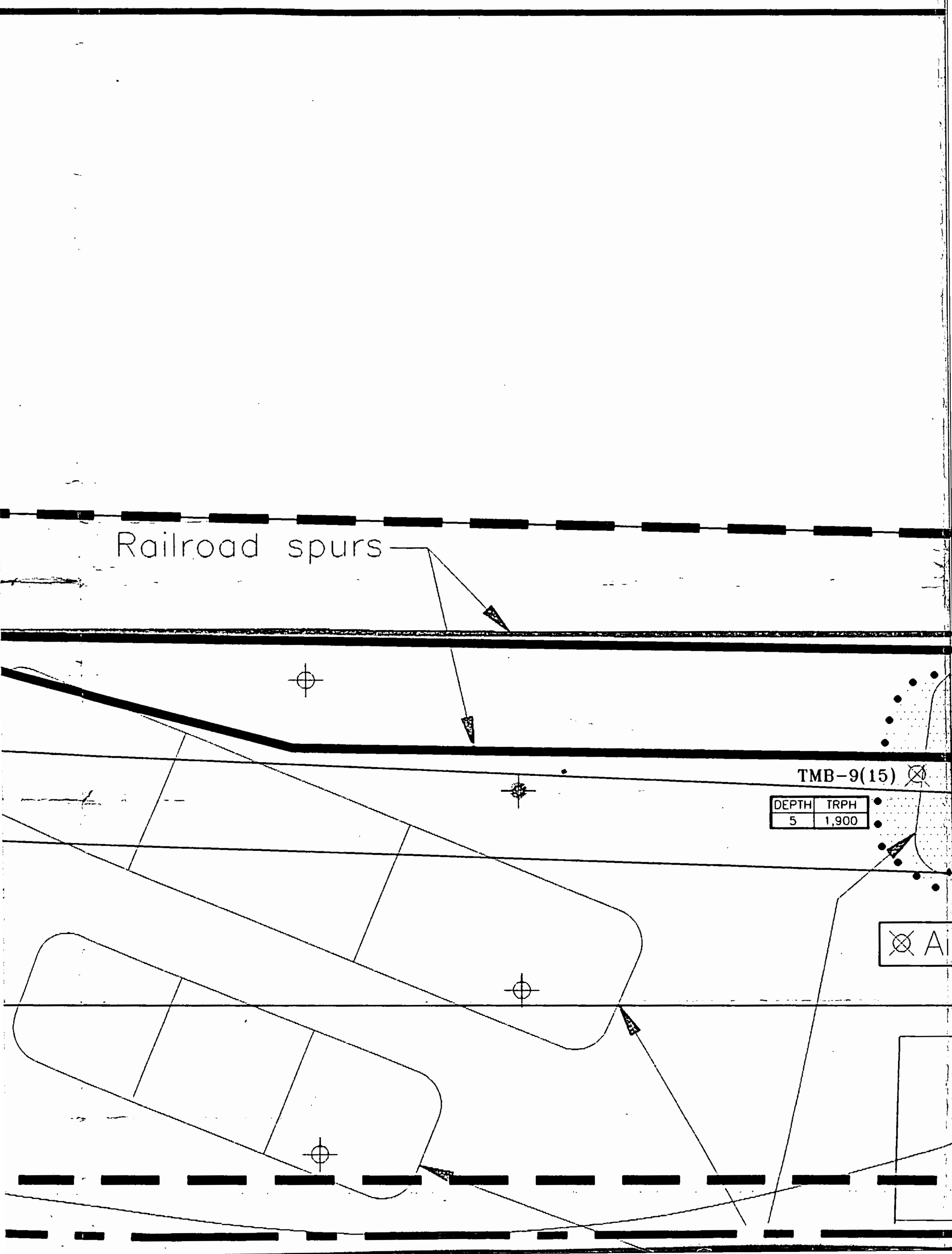




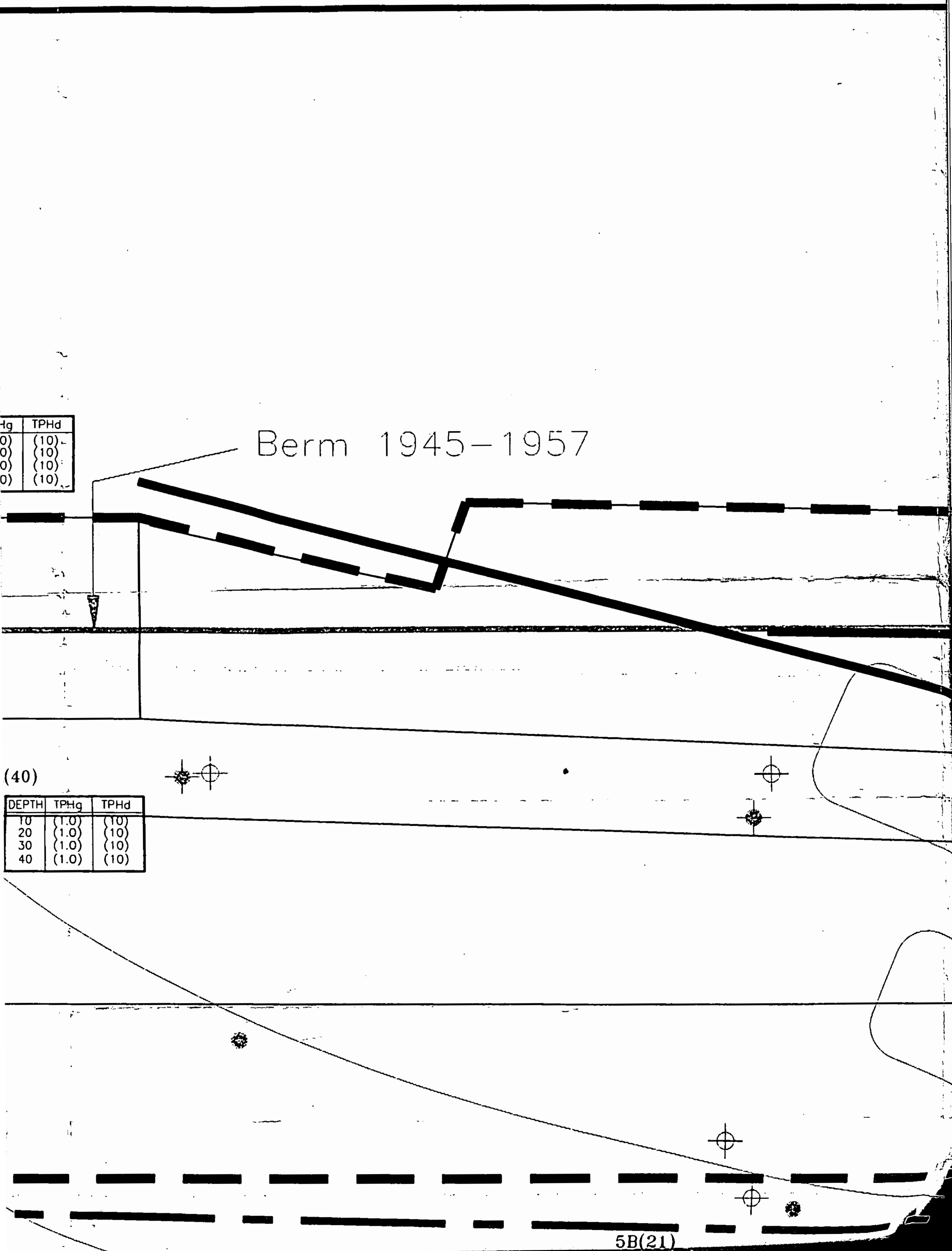
RAILROAD SECTIO
928-1974
DEPTH TRPH
10 7,000
15 (5)
B-7(15)
TRPH
110
TMB-6(15)
Loading rack
(POWERINE OIL)
TMB-5(20)
DEPTH TRPH
10 11,000
20 (5)
3(1
Electrical panel
ANALYTE DEPTH 11-13.5
BENZENE (0.05)
TOLUENE (0.05)
ETHYLBENZENE (0.05)
XYLENE (0.05)
8010 (0.05)
Stormwate
Inlet



Berm 1928-
TMB-8(15)
DEPTH TRPH
10 (5)
TMB-7(15)
DEPTH TRPH
10 110
(15)
Airco
(GROSS CONSTRUCTION)
Vehicle storage 1981-1989



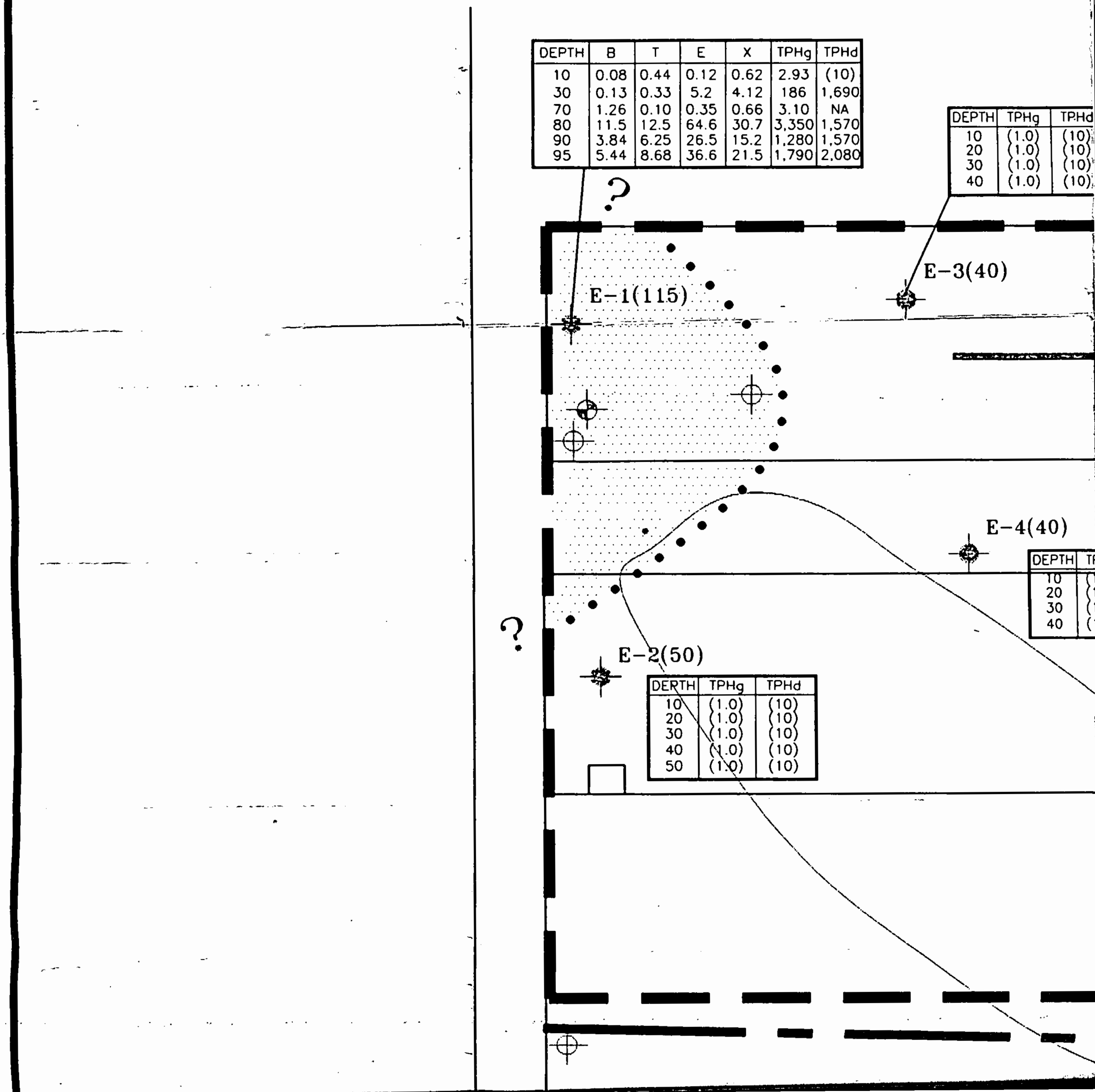
Railroad spurs
TMB-9(15)
DEPTH | TRPH
5 | 1,900



Hg	TPHd
0)	(10)
0)	(10)
0)	(10)
0)	(10)

DEPTH	TPHg	TPHd
10	(1.0)	(10)
20	(1.0)	(10)
30	(1.0)	(10)
40	(1.0)	(10)

USER1 HDL\22263\2\S1A

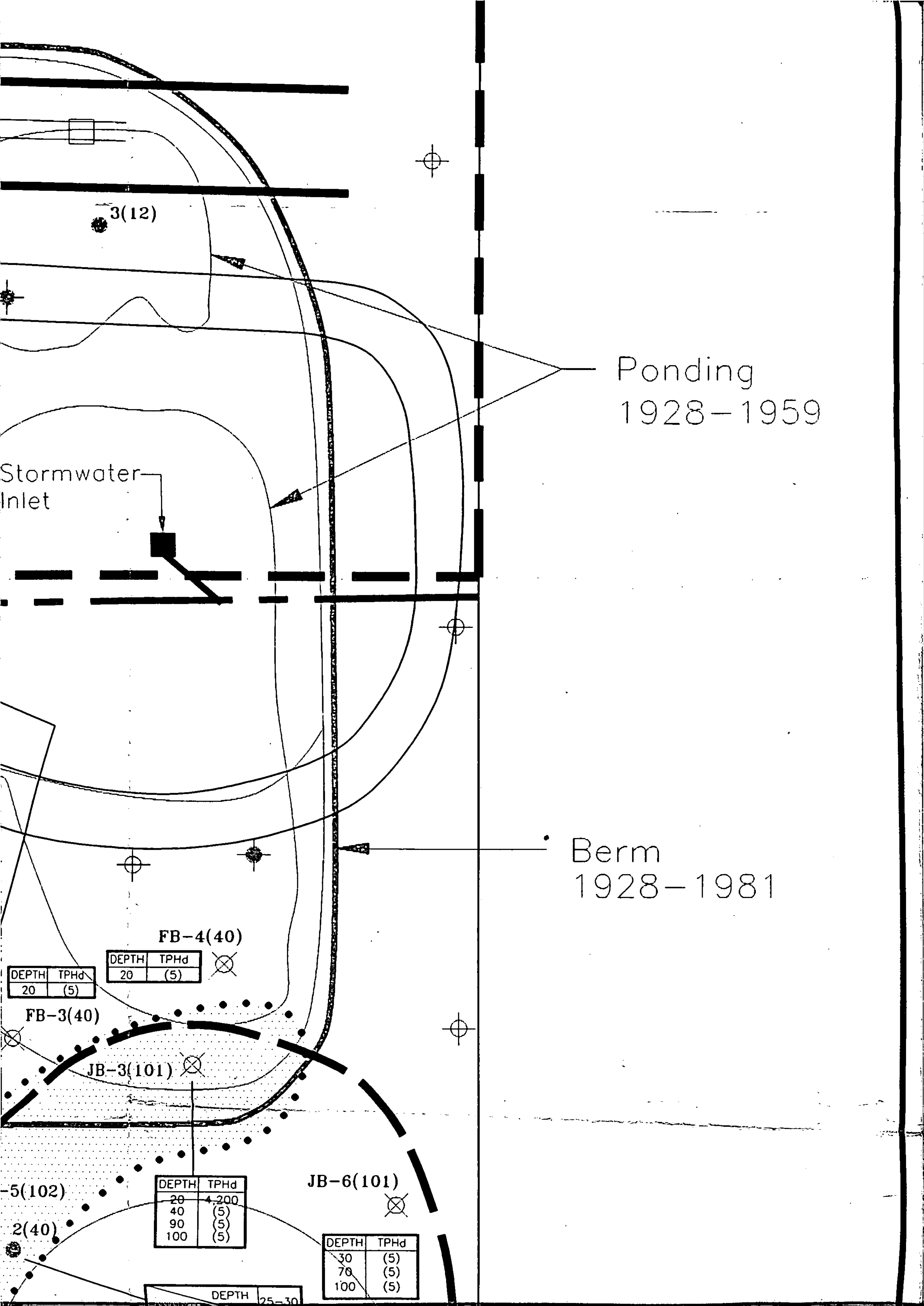


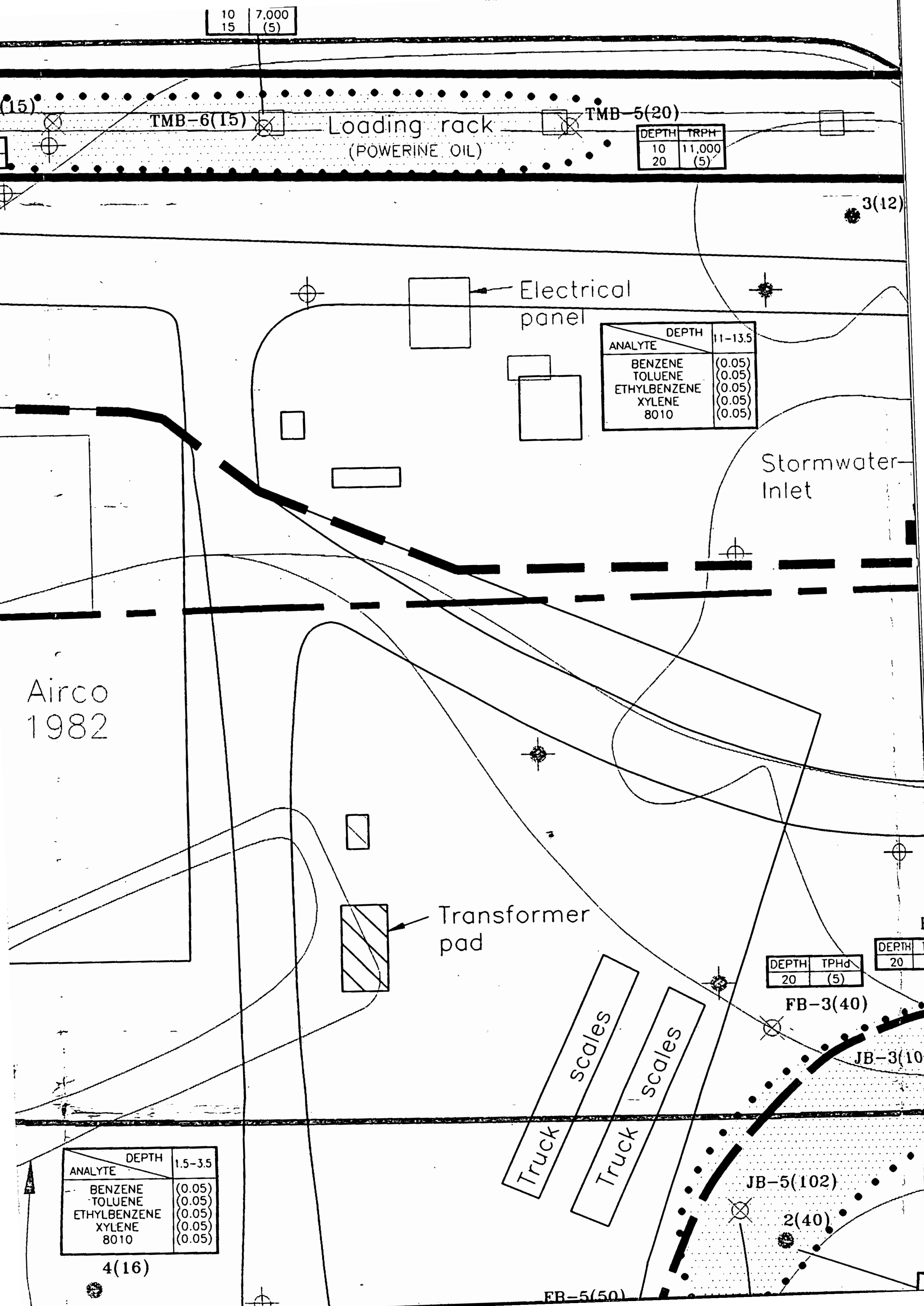
DEPTH	B	T	E	X	TPHg	TPHd
10	0.08	0.44	0.12	0.62	2.93	(10)
30	0.13	0.33	5.2	4.12	186	1,690
70	1.26	0.10	0.35	0.66	3.10	NA
80	11.5	12.5	64.6	30.7	3,350	1,570
90	3.84	6.25	26.5	15.2	1,280	1,570
95	5.44	8.68	36.6	21.5	1,790	2,080

DEPTH	TPHg	TPHd
10	(1.0)	(10)
20	(1.0)	(10)
30	(1.0)	(10)
40	(1.0)	(10)

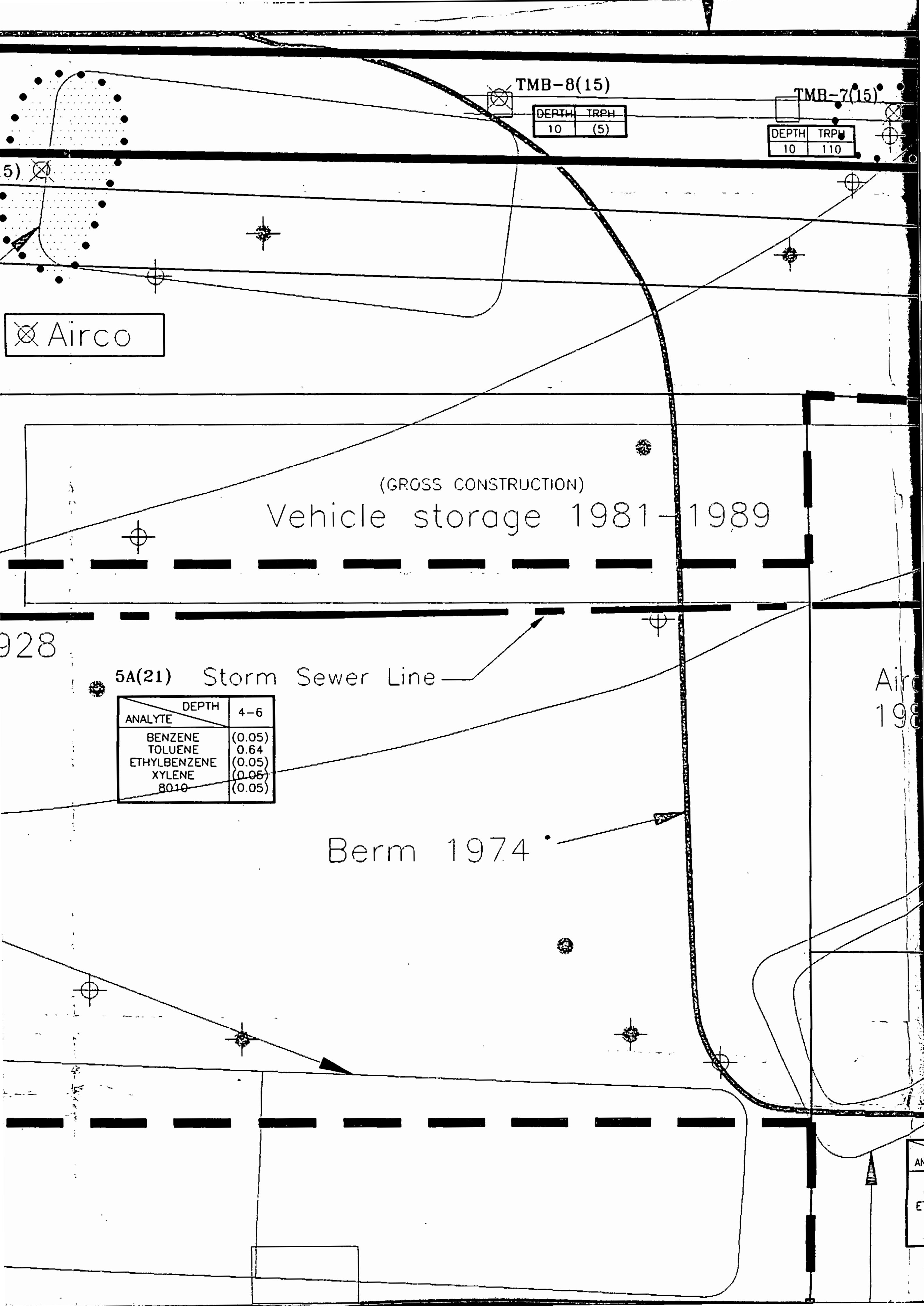
DEPTH	TP
10	(
20	(
30	(
40	(

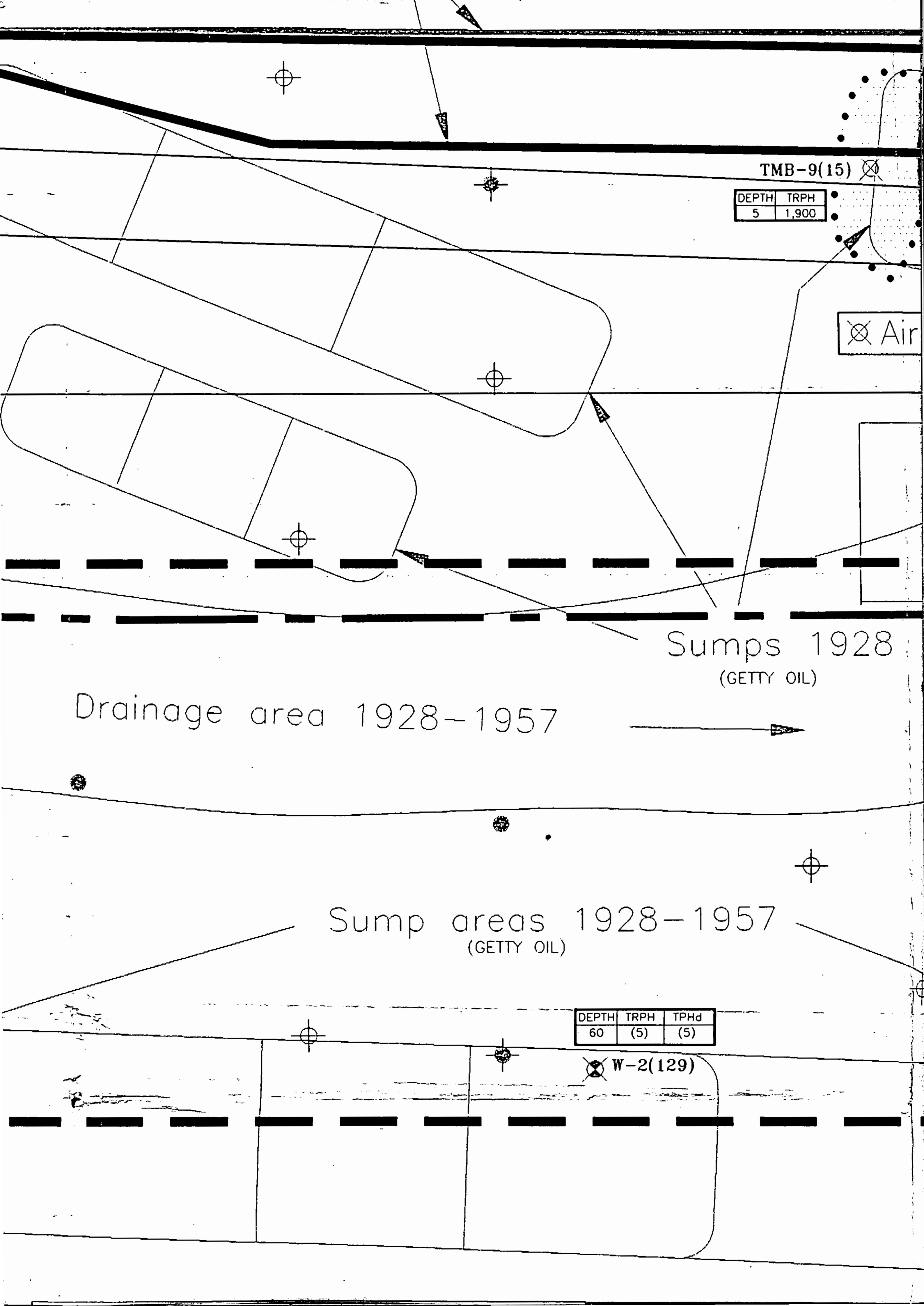
DEPTH	TPHg	TPHd
10	(1.0)	(10)
20	(1.0)	(10)
30	(1.0)	(10)
40	(1.0)	(10)
50	(1.0)	(10)

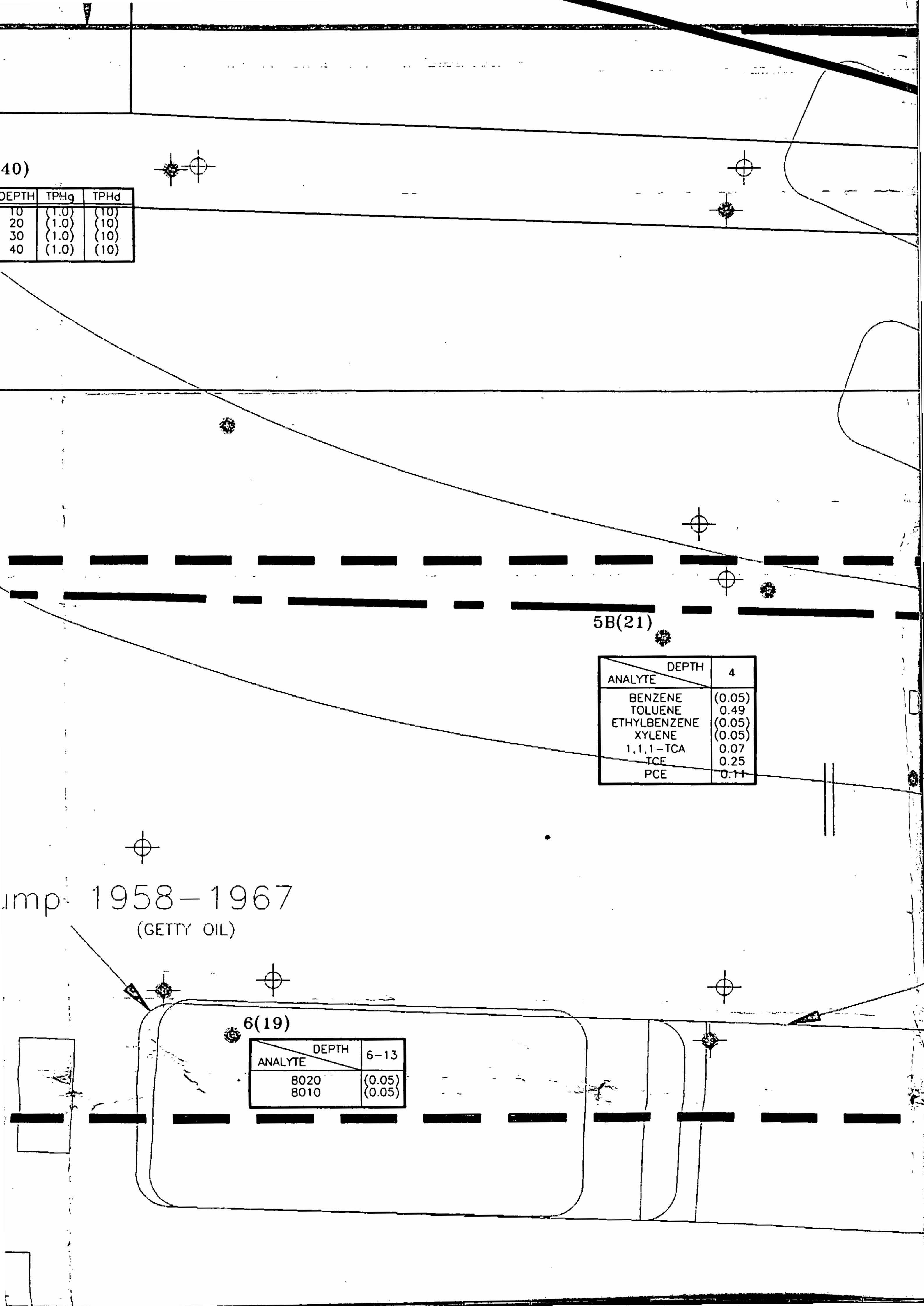

3(12)
Ponding
1928-1959
Stormwater
Inlet
Berm
1928-1981
FB-4(40)
DEPTH TPHd
20 (5)
DEPTH TPHd
20 (5)
FB-3(40)
JB-3(101)
-5(102)
JB-6(101)
DEPTH TPHd
20 4,200
40 (5)
90 (5)
100 (5)
2(40)
DEPTH TPHd
30 (5)
70 (5)
100 (5)
DEPTH 25-30



10 15 | 7,000 (5)
(15)
TMB-6(15)
Loading rack
(POWERINE OIL)
TMB-5(20)
DEPTH | TRPH
10 20 | 11,000 (5)
3(12)
Electrical panel
DEPTH
ANALYTE
11-13.5
BENZENE (0.05)
TOLUENE (0.05)
ETHYLBENZENE (0.05)
XYLENE (0.05)
8010 (0.05)
Stormwater Inlet
Airco 1982
Transformer pad
Truck scales
Truck scales
DEPTH | TPHd
20 | (5)
FB-3(40)
DEPTH
20
JB-3(10
JB-5(102)
2(40)
DEPTH
ANALYTE
1.5-3.5
BENZENE (0.05)
TOLUENE (0.05)
ETHYLBENZENE (0.05)
XYLENE (0.05)
8010 (0.05)
4(16)
FB-5(50)


TMB-8(15)
DEPTH TRPH
10 (5)
TMB-7(15)
DEPTH TRPH
10 110
5)
Airco
(GROSS CONSTRUCTION)
Vehicle storage 1981–1989
928
5A(21)
Storm Sewer Line
DEPTH 4–6
ANALYTE
BENZENE (0.05)
TOLUENE 0.64
ETHYLBENZENE (0.05)
XYLENE (0.05)
8010 (0.05)
Berm 1974

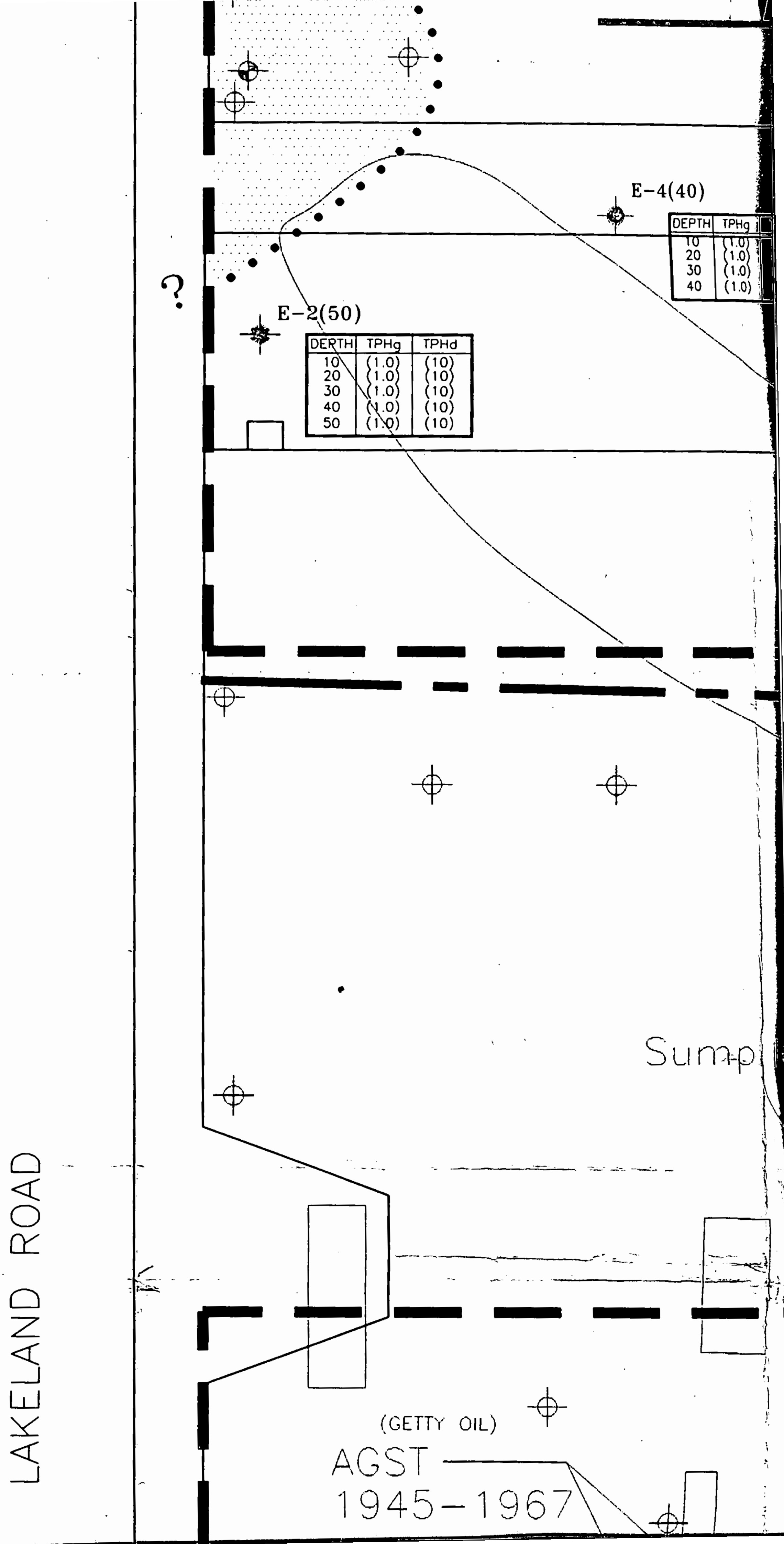

TMB-9(15)
DEPTH TRPH
5 1,900
Air
Sumps 1928
(GETTY OIL)
Drainage area 1928–1957
Sump areas 1928–1957
(GETTY OIL)
DEPTH TRPH TPHd
60 (5) (5)
W-2(129)



DEPTH	TPHg	TPHd
10	(1.0)	(10)
20	(1.0)	(10)
30	(1.0)	(10)
40	(1.0)	(10)

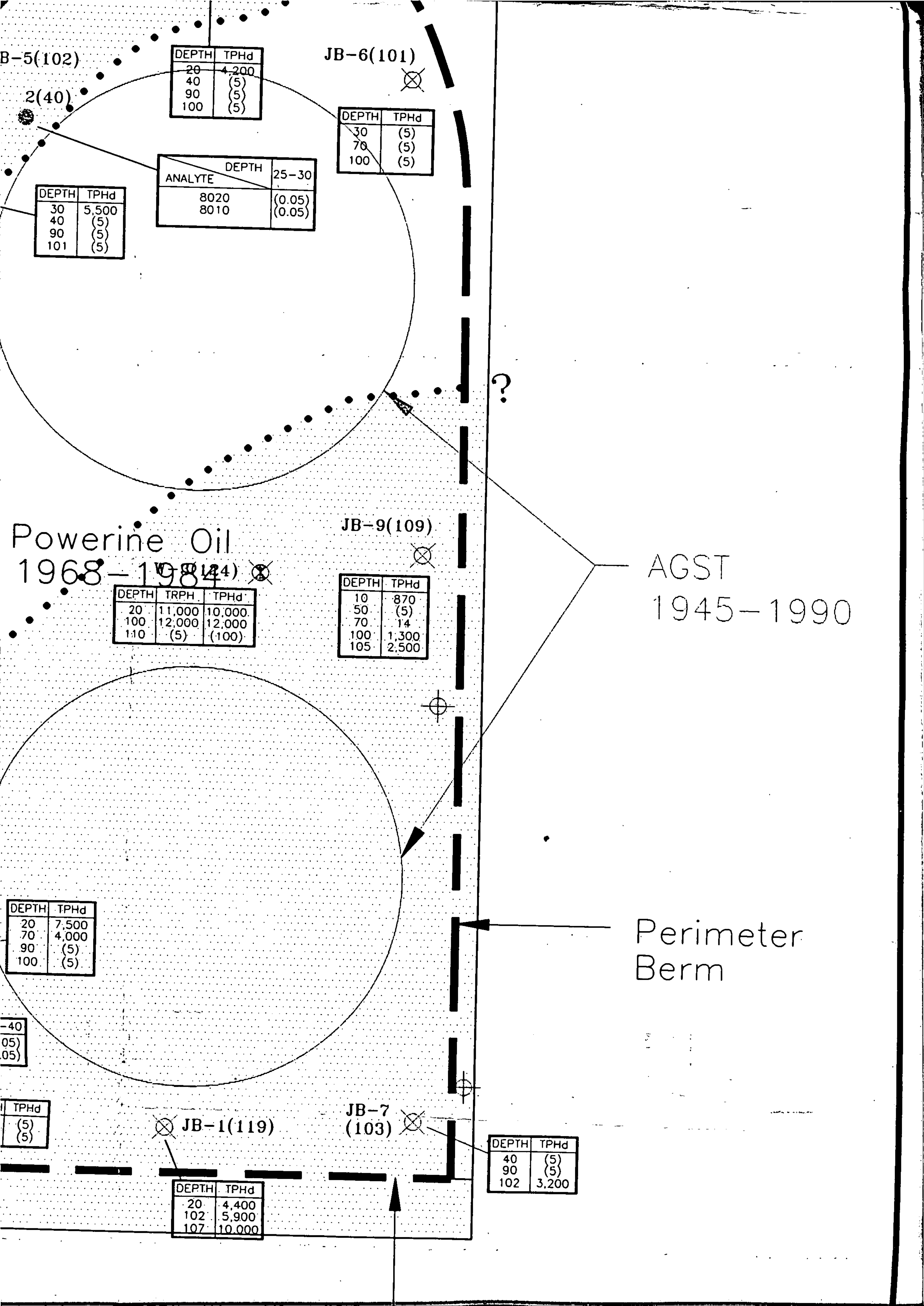
ANALYTE \ DEPTH	4
BENZENE	(0.05)
TOLUENE	0.49
ETHYLBENZENE	(0.05)
XYLENE	(0.05)
1,1,1–TCA	0.07
TCE	0.25
PCE	0.11

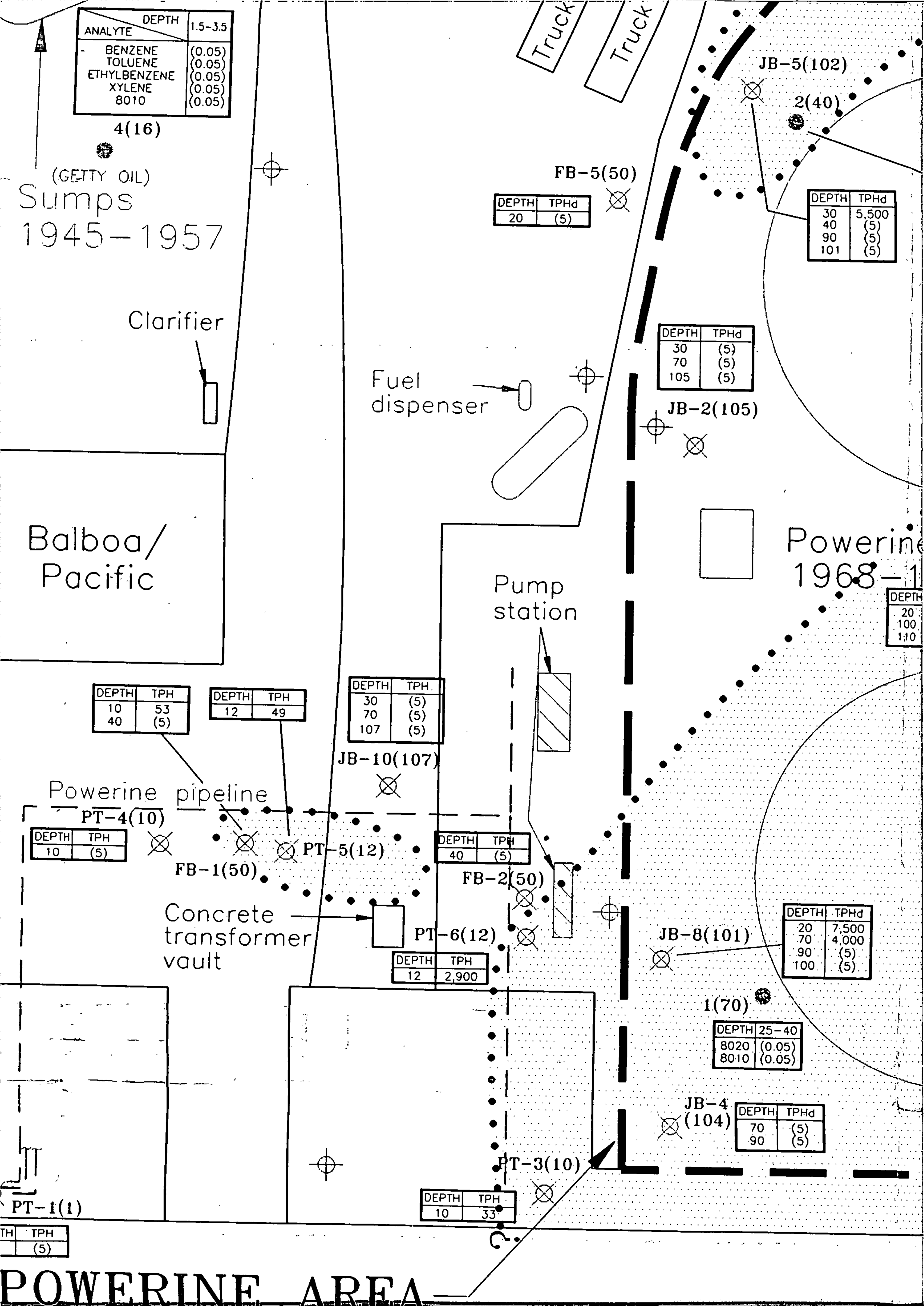
ANALYTE \ DEPTH	6–13
8020	(0.05)
8010	(0.05)



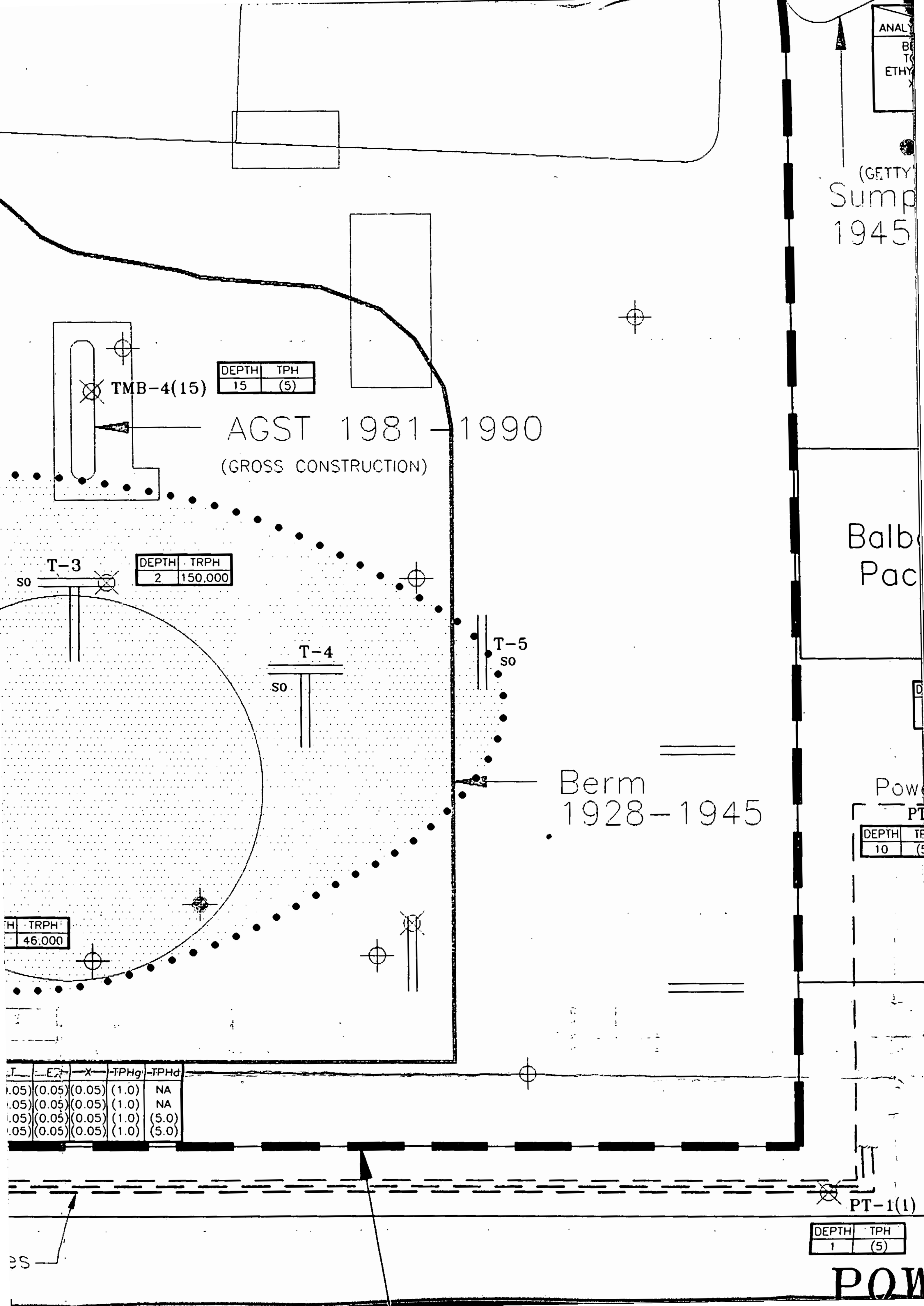
DEPTH	TPHg
10	(1.0)
20	(1.0)
30	(1.0)
40	(1.0)

DEPTH	TPHg	TPHd
10	(1.0)	(10)
20	(1.0)	(10)
30	(1.0)	(10)
40	(1.0)	(10)
50	(1.0)	(10)

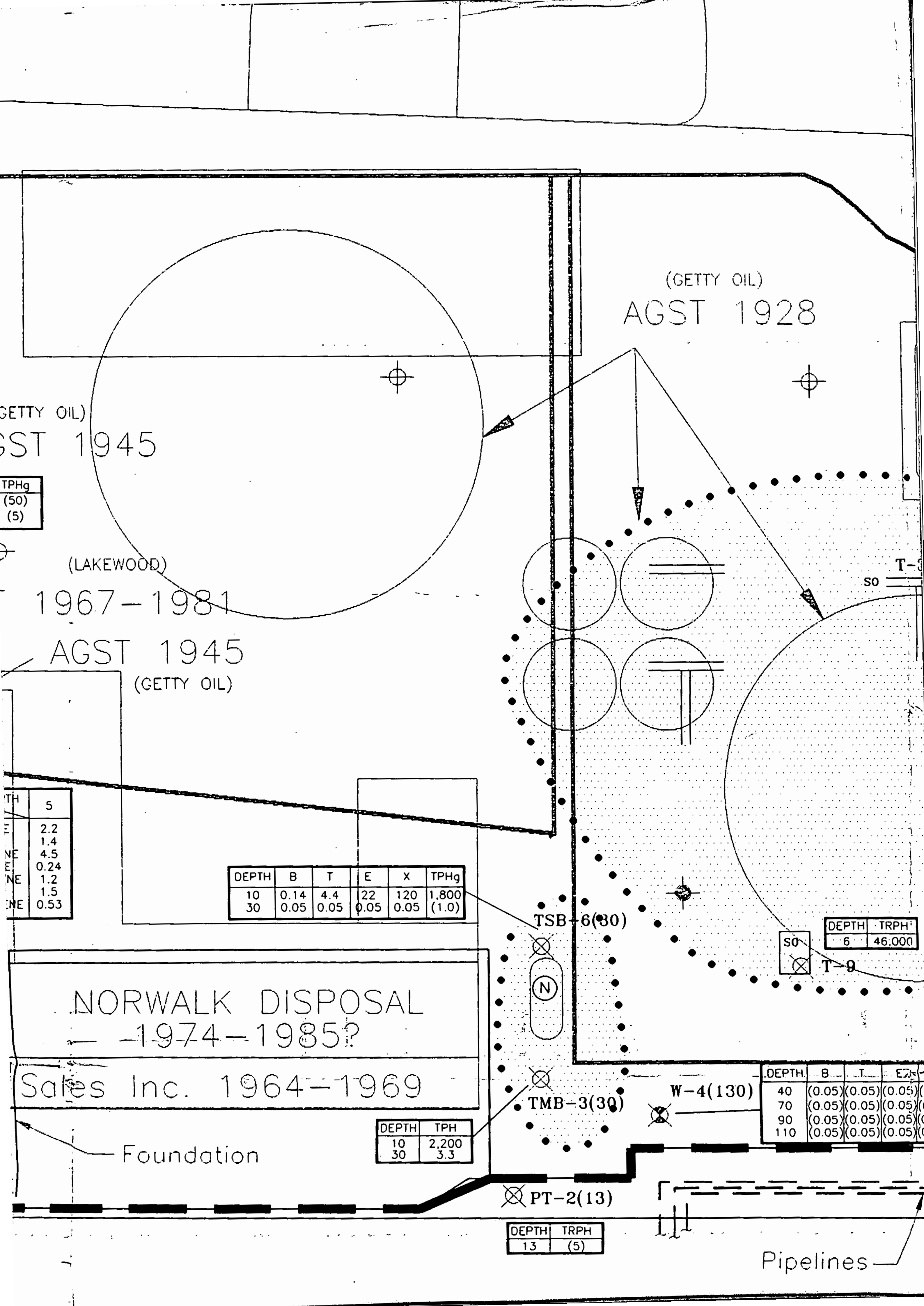

B-5(102)
2(40)
DEPTH TPHd
20 4,200
40 (5)
90 (5)
100 (5)
JB-6(101)
DEPTH TPHd
30 (5)
70 (5)
100 (5)
ANALYTE DEPTH 25-30
8020 (0.05)
8010 (0.05)
DEPTH TPHd
30 5,500
40 (5)
90 (5)
101 (5)
?
Powerine Oil
1968-1984
JB-9(109)
DEPTH TRPH TPHd
20 11,000 10,000
100 12,000 12,000
110 (5) (100)
DEPTH TPHd
10 870
50 (5)
70 14
100 1,300
105 2,500
AGST
1945-1990
DEPTH TPHd
20 7,500
70 4,000
90 (5)
100 (5)
Perimeter
Berm
-40
05)
.05)
TPHd
(5)
(5)
JB-1(119)
JB-7
(103)
DEPTH TPHd
40 (5)
90 (5)
102 3,200
DEPTH TPHd
20 4,400
102 5,900
107 10,000

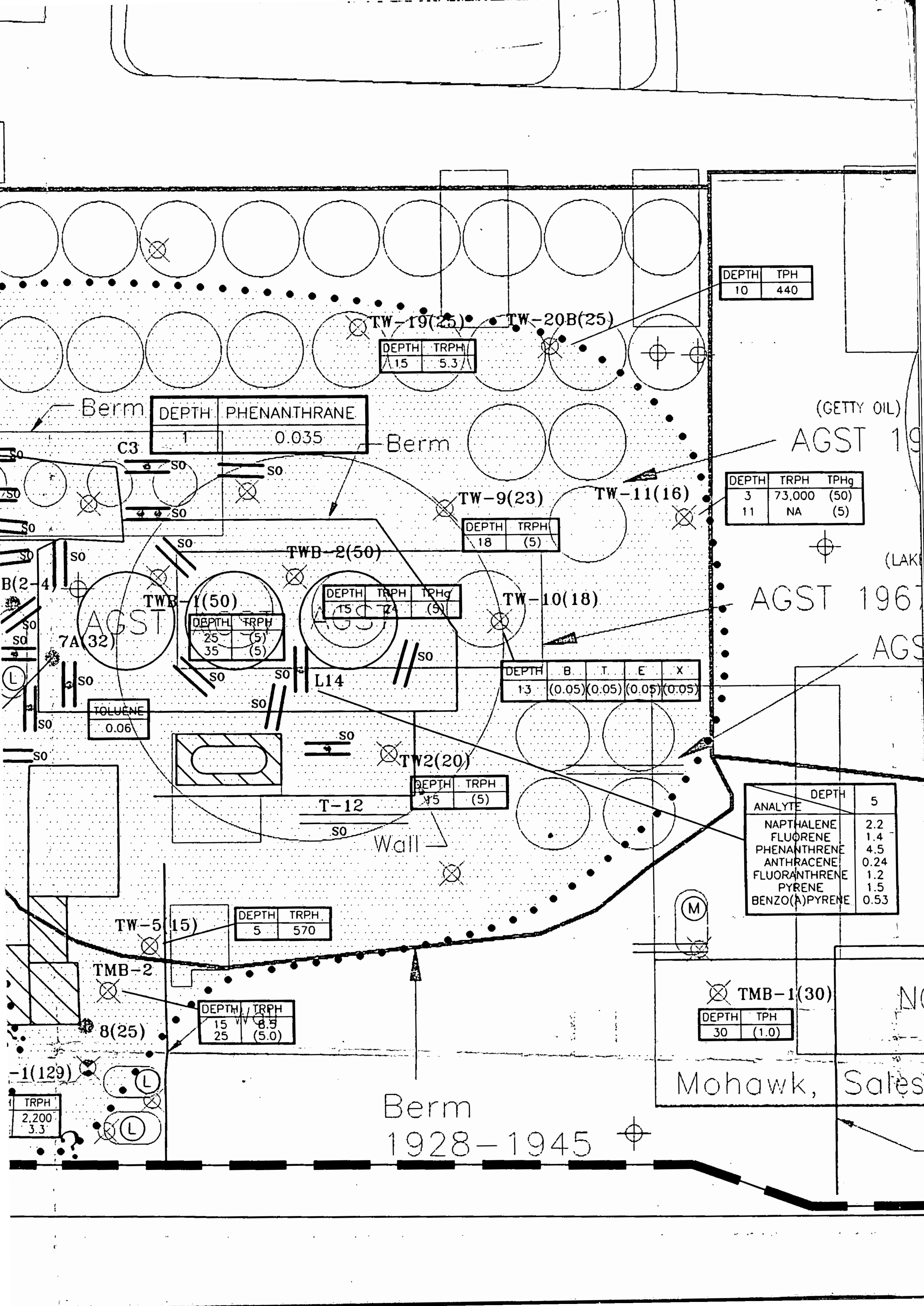


DEPTH 1.5-3.5
ANALYTE
BENZENE (0.05)
TOLUENE (0.05)
ETHYLBENZENE (0.05)
XYLENE (0.05)
8010 (0.05)
4(16)
(GETTY OIL)
Sumps
1945-1957
Clarifier
Balboa/
Pacific
Truck
Truck
JB-5(102)
2(40)
FB-5(50)
DEPTH TPHd
20 (5)
DEPTH TPHd
30 5,500
40 (5)
90 (5)
101 (5)
DEPTH TPHd
30 (5)
70 (5)
105 (5)
Fuel
dispenser
JB-2(105)
Powerine
1968-1
Pump
station
DEPTH
20
100
110
DEPTH TPH
10 53
40 (5)
DEPTH TPH
12 49
DEPTH TPH
30 (5)
70 (5)
107 (5)
JB-10(107)
Powerine pipeline
PT-4(10)
DEPTH TPH
10 (5)
FB-1(50)
PT-5(12)
DEPTH TPH
40 (5)
FB-2(50)
Concrete
transformer
vault
PT-6(12)
DEPTH TPH
12 2,900
JB-8(101)
DEPTH TPHd
20 7,500
70 4,000
90 (5)
100 (5)
1(70)
DEPTH 25-40
8020 (0.05)
8010 (0.05)
JB-4
(104)
DEPTH TPHd
70 (5)
90 (5)
PT-3(10)
DEPTH TPH
10 33
PT-1(1)
TH TPH
(5)
POWERINE AREA

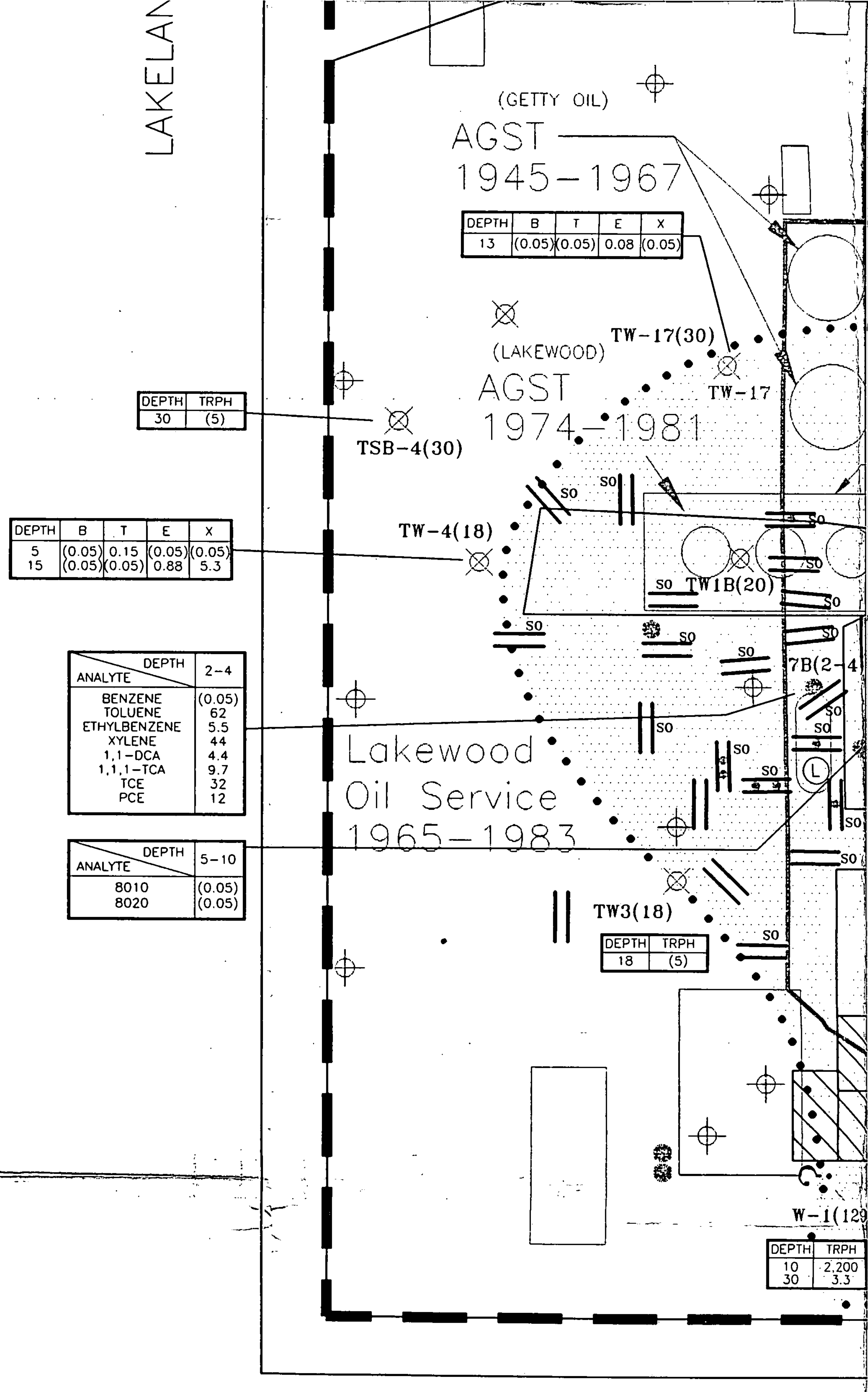


(GETTY
Sump
1945
TMB-4(15)
DEPTH TPH
15 (5)
AGST 1981–1990
(GROSS CONSTRUCTION)
T-3
SO
DEPTH TRPH
2 150,000
T-4
SO
T-5
SO
Berm
1928–1945
TRPH
46,000
DEPTH
10
PT-1(1)
DEPTH TPH
1 (5)
X TPHg TPHd
(0.05) (0.05) (1.0) NA
(0.05) (0.05) (1.0) NA
(0.05) (0.05) (1.0) (5.0)
(0.05) (0.05) (1.0) (5.0)

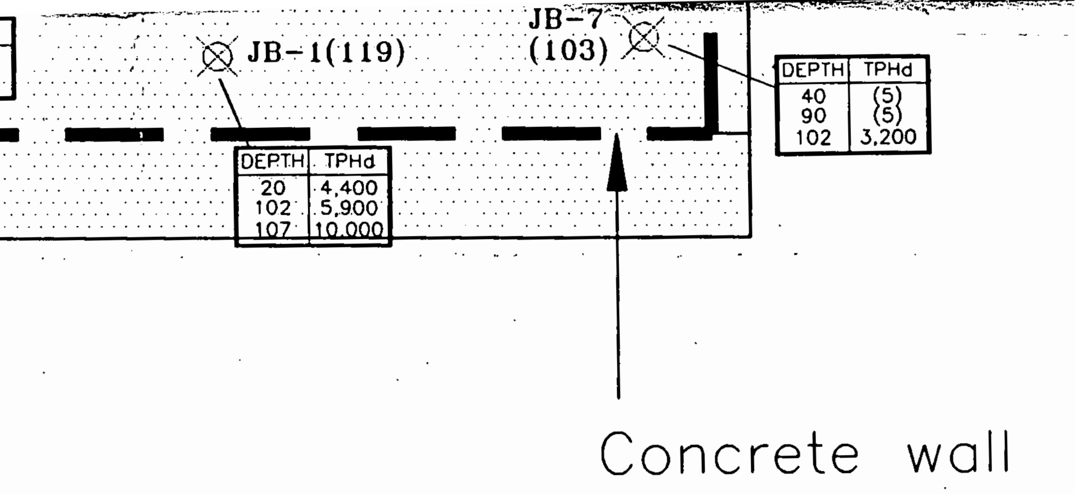

(GETTY OIL)
AGST 1928
(GETTY OIL)
AGST 1945
TPHg
(50)
(5)
(LAKEWOOD)
1967–1981
AGST 1945
(GETTY OIL)
5
2.2
1.4
4.5
0.24
1.2
1.5
0.53
DEPTH B T E X TPHg
10 0.14 4.4 22 120 1,800
30 0.05 0.05 0.05 0.05 (1.0)
TSB-6(30)
T-3
SO
DEPTH TRPH
6 46,000
SO
T-9
NORWALK DISPOSAL
1974–1985?
Sales Inc. 1964–1969
Foundation
DEPTH TPH
10 2,200
30 3.3
TMB-3(30)
W-4(130)
DEPTH B T E
40 (0.05) (0.05) (0.05)
70 (0.05) (0.05) (0.05)
90 (0.05) (0.05) (0.05)
110 (0.05) (0.05) (0.05)
PT-2(13)
DEPTH TRPH
13 (5)
Pipelines



DEPTH TPH
10 440
TW-19(25)
TW-20B(25)
DEPTH TRPH
15 5.3
Berm
DEPTH PHENANTHRANE
1 0.035
Berm
(GETTY OIL)
AGST 19
C3
SO
TW-9(23)
TW-11(16)
DEPTH TRPH TPHg
3 73,000 (50)
11 NA (5)
DEPTH TRPH
18 (5)
TWB-2(50)
(LAKE
B(2-4)
TWB-1(50)
AGST
DEPTH TRPH TPHg
15 74 (5)
DEPTH TRPH
25 (5)
35 (5)
TW-10(18)
AGST 196
AGS
7A(32)
L
L14
DEPTH B T E X
13 (0.05) (0.05) (0.05) (0.05)
TOLUENE
0.06
TW2(20)
DEPTH TRPH
15 (5)
T-12
Wall
ANALYTE DEPTH 5
NAPTHALENE 2.2
FLUORENE 1.4
PHENANTHRENE 4.5
ANTHRACENE 0.24
FLUORANTHRENE 1.2
PYRENE 1.5
BENZO(A)PYRENE 0.53
M
TW-5(15)
DEPTH TRPH
5 570
TMB-2
TMB-1(30)
DEPTH TPH
30 (1.0)
8(25)
DEPTH TRPH
15 8.5
25 (5.0)
Wall
-1(129)
TRPH
2,200
3.3
Mohawk, Sales
Berm
1928-1945



LAKELAN
(GETTY OIL)
AGST
1945-1967
DEPTH | B | T | E | X
13 | (0.05) | (0.05) | 0.08 | (0.05)
(LAKEWOOD)
AGST
1974-1981
TW-17(30)
TW-17
DEPTH | TRPH
30 | (5)
TSB-4(30)
TW-4(18)
DEPTH | B | T | E | X
5 | (0.05) | 0.15 | (0.05) | (0.05)
15 | (0.05) | (0.05) | 0.88 | 5.3
TW1B(20)
SO
7B(2-4
DEPTH 2-4
ANALYTE
BENZENE (0.05)
TOLUENE 62
ETHYLBENZENE 5.5
XYLENE 44
1,1-DCA 4.4
1,1,1-TCA 9.7
TCE 32
PCE 12
Lakewood
Oil Service
1965-1983
DEPTH 5-10
ANALYTE
8010 (0.05)
8020 (0.05)
TW3(18)
DEPTH | TRPH
18 | (5)
W-1(129
DEPTH | TRPH
10 | 2,200
30 | 3.3



Harding Lawson Associates
Engineering and
Environmental Services

3 Hutton Centre Drive
Suite 300
Santa Ana, CA 92707

HLA PROJECT NUMBER: 22263-2

CLIENT NAME: TEXACO, INC.

DRAWN BY: LJH DATE: 2/93

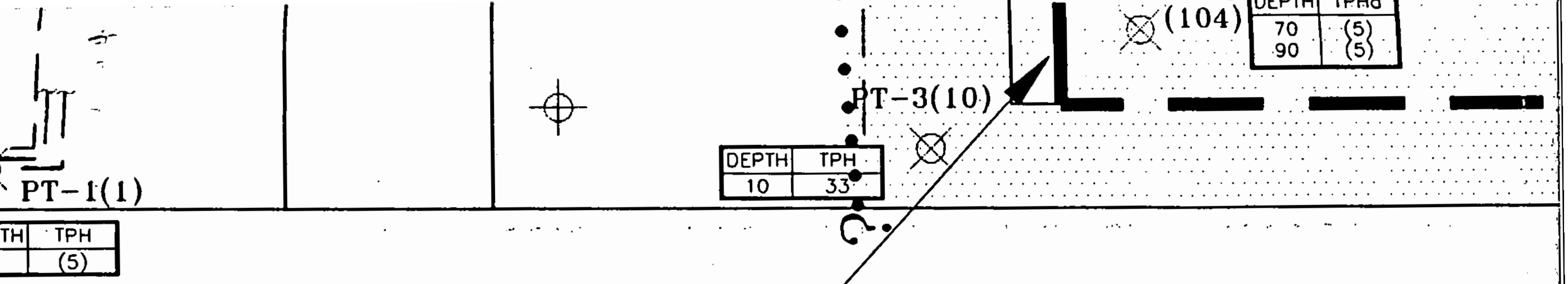
CHECKED BY: DWQ DATE: 4/93

APPROVED BY:
HLA: DWQ DATE: 4/93
CLIENT: ______

DRAWING TITLE:
EXISTING HYDROCARBONS
Walker Property Site
Santa Fe Springs, California

PLATE **7c**

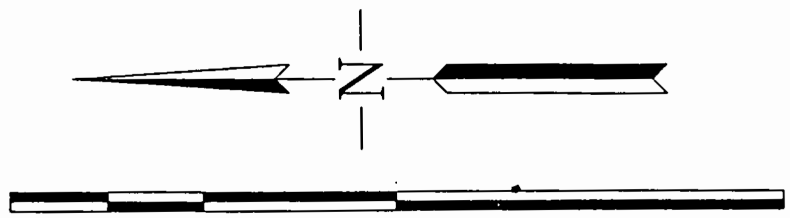
SCALE: 1" = 100'

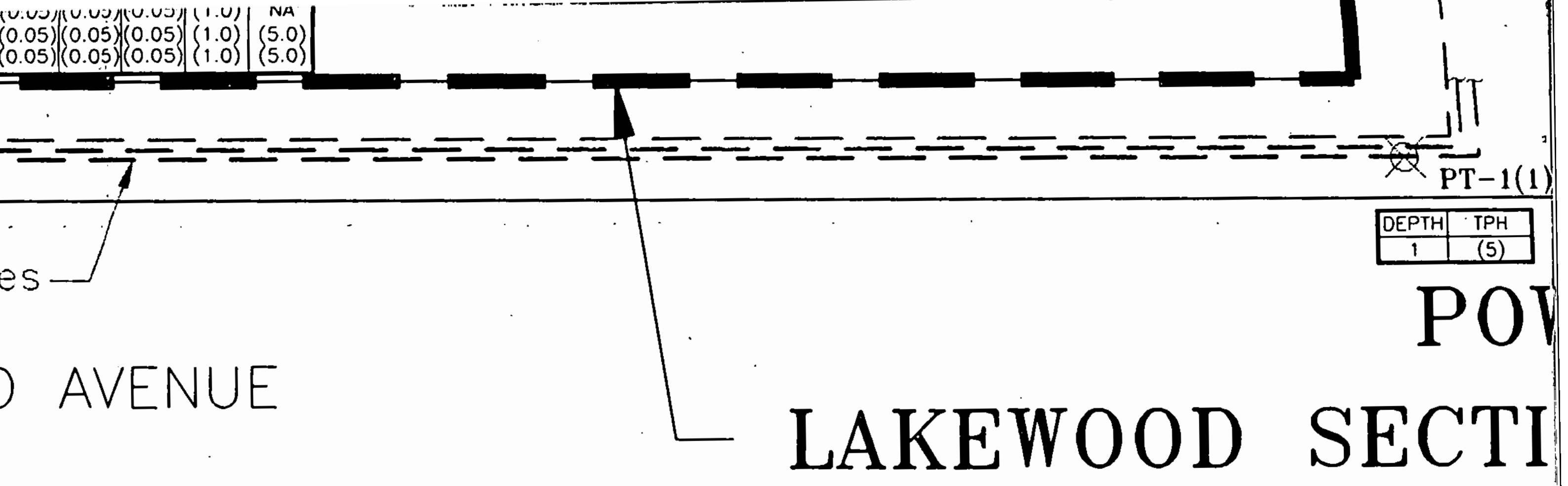


POWERINE AREA
CTION

ting features

ous features





Black line indicates existing

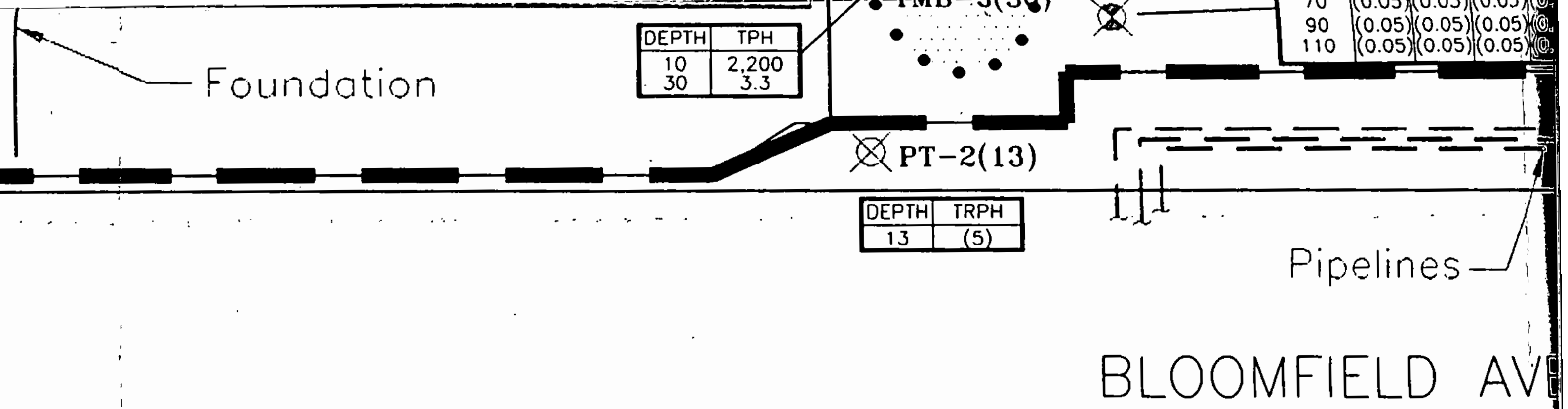
Gray line indicates previous

eled sample locations not analyzed for hydrocarbons.
(Purgeable Halogenated Volatile Organics) – Dames and Moore, 1 through 8 only
(Purgeable Nonhalogenated Volatile Organics) – only analyzed where shown
(Aromatic Volatile Organics) – only analyzed where shown
(Polynuclear Aromatic Hydrocarbons) – Dames and Moore, C3 and L14 only
(Total Recoverable Petroleum Hydrocarbons) – only analyzed where shown

ncentrations in milligrams per kilogram (mg/kg); (   ) indicates not detected
the enclosed detection limit

eled points not analyzed for hydrocarbons

= 1,1-Dichloroethane
= 1,1,1-Trichloroethane
= Trichloroethene
= Tetrachloroethene
= Benzene
= Toluene
= Ethylbenzene
= Xylene
= Total Recoverable Petroleum Hydrocarbons
= Total Petroleum Hydrocarbons (as diesel or gasoline)



mate extent of Hydrocarbon-impacted soil

soil observed

wash-down sump

te pad

revious tenants are approximate,
daries unknown.

ervice

Inc. 1964

al ?

NOTES

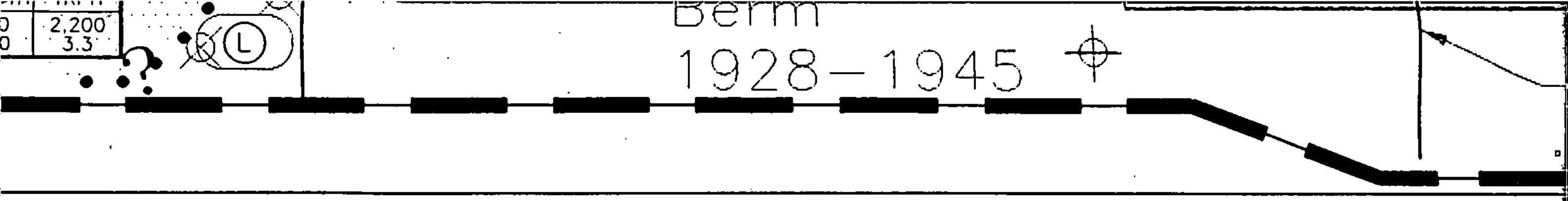
Unlabeled sam

Analyses performed – EPA Method: 8010 (Purgeab
8015 (Purgeab
8020 (Aromati
8310 (Polynuc
418.1 (Total R

All concentratio
above the encl

Unlabeled poin

Abbreviations: 1,1-DCA = 1,1-Di
1,1,1-TCA = 1,1,1-
TCE = Trichlo
PCE = Tetrach
B = Benzen
T = Toluen
E = Ethylbe
X = Xylene
TRPH = Total
TPH (g or d) = Total



e soil boring

g

tical vapor well

hes by Dames and Moore
proximately 8 to 9 feet)
location

hes by TRC
location

Approximate

SO Stained soil

Truck wash–

Concrete pa

NOTES

Locations of previous ten
leasehold boundaries unk

(L) Lakewood Oil Service

(M) Mohawk Sales, Inc. 1964

(N) Norwalk Disposal ?

10	2,200
30	3.3

EXPLANANTION

Dames and Moore s

E-1(115)

Boring No.

Depth (feet)

EMCON soil boring

EMCON well

Geoscience Analytica

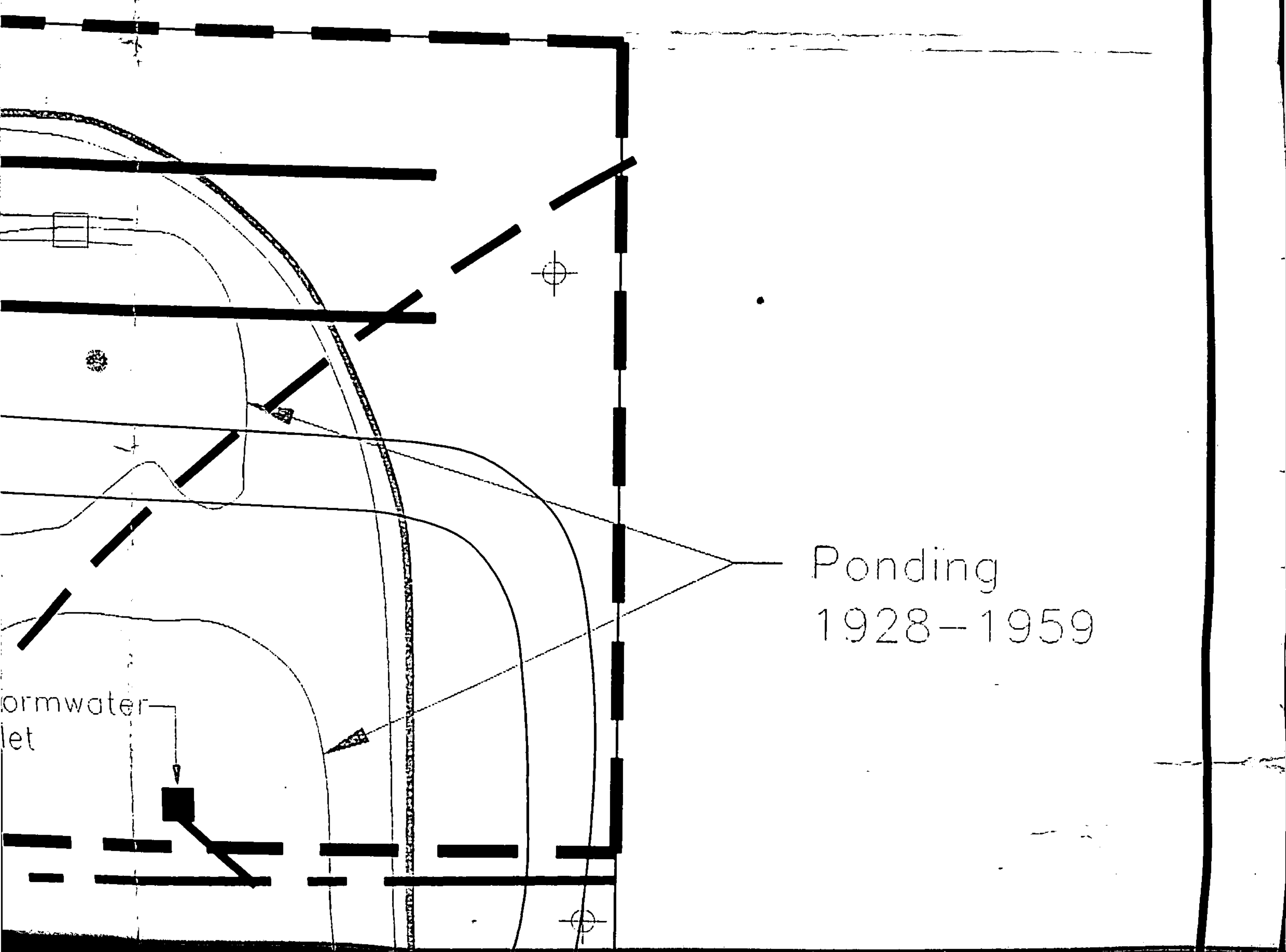
TRC soil boring

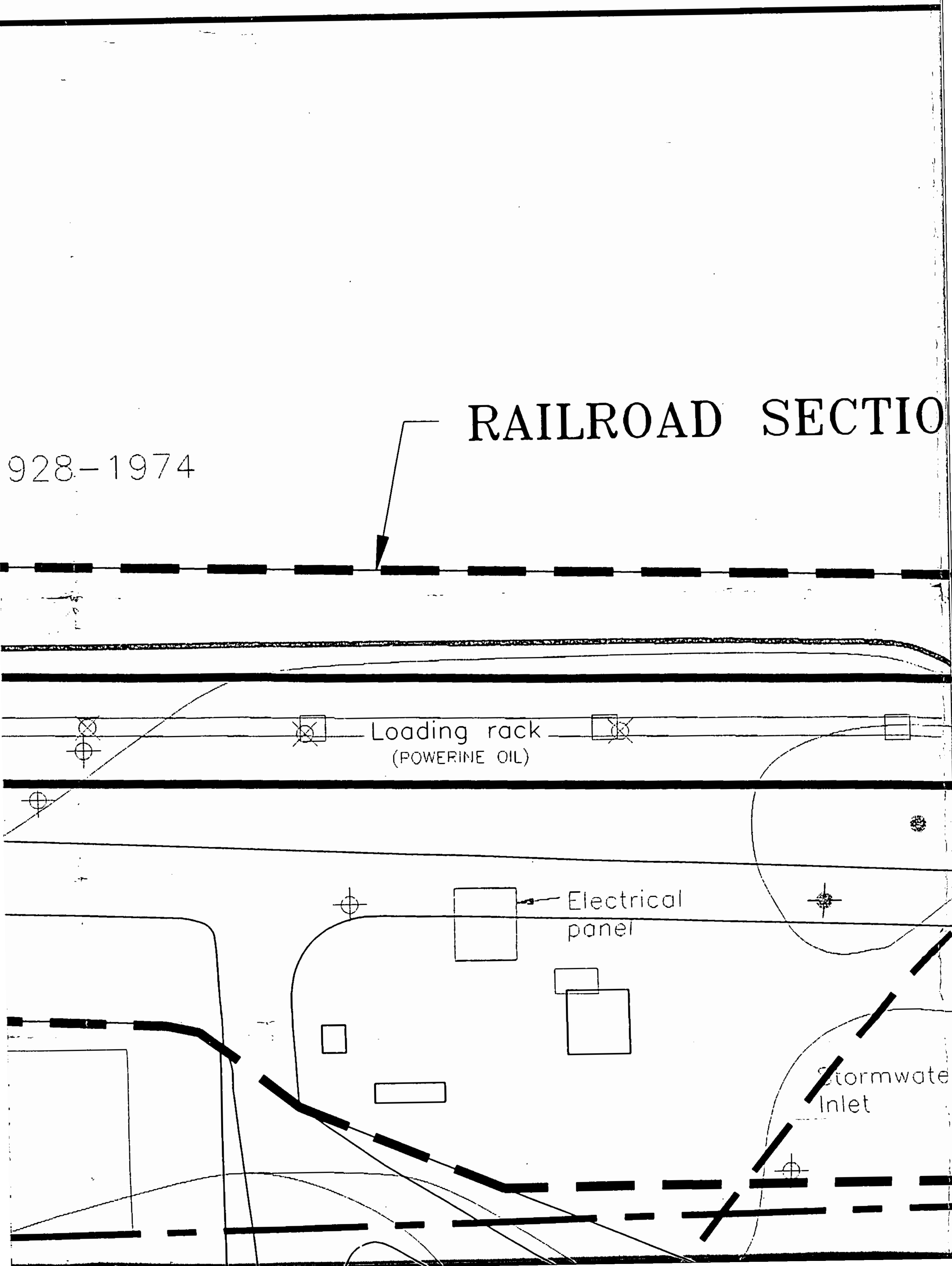
TRC well

32 shallow trenches
(total depths approx
with sample loca

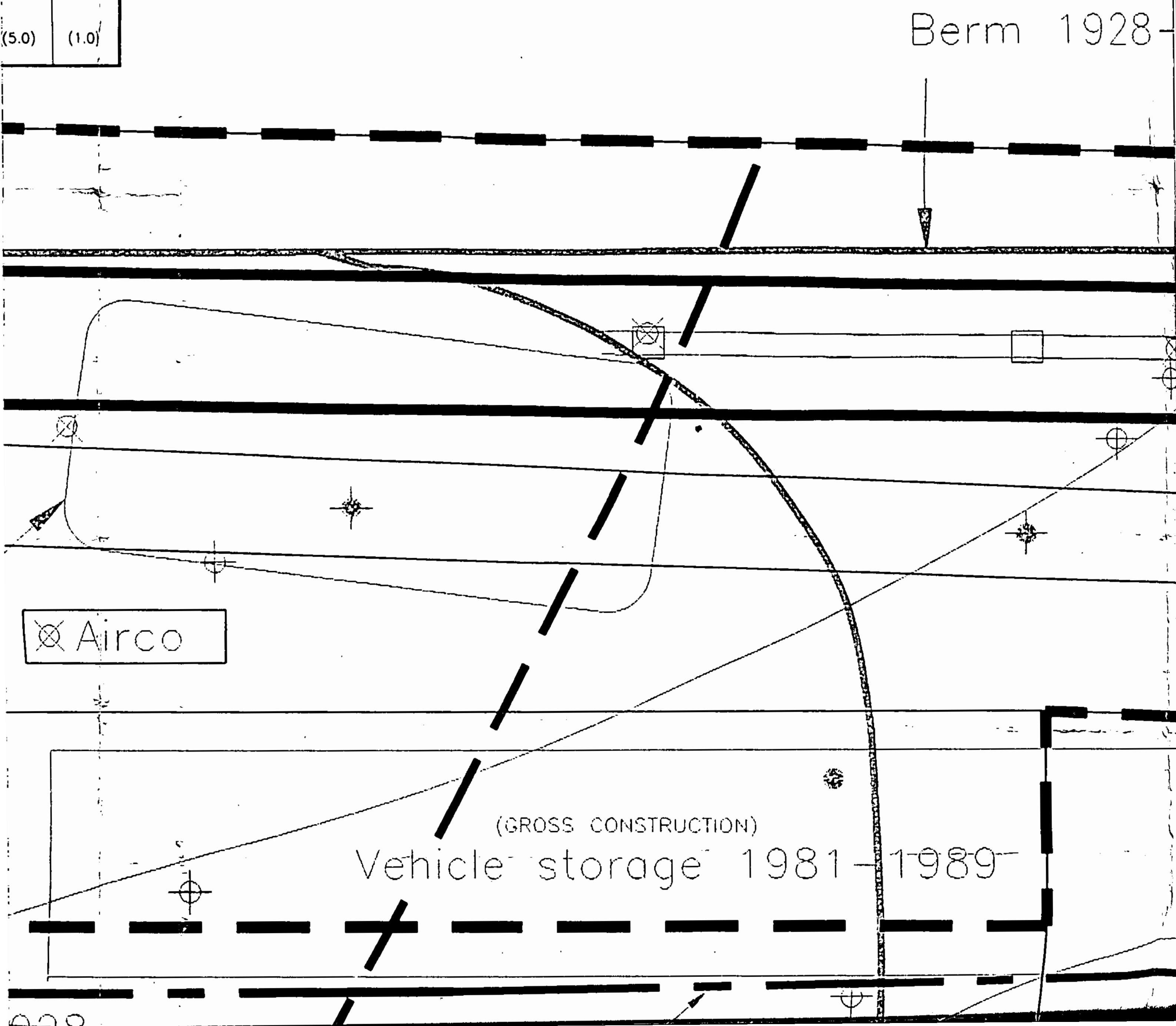
16 shallow trenches
with sample loca

CTION

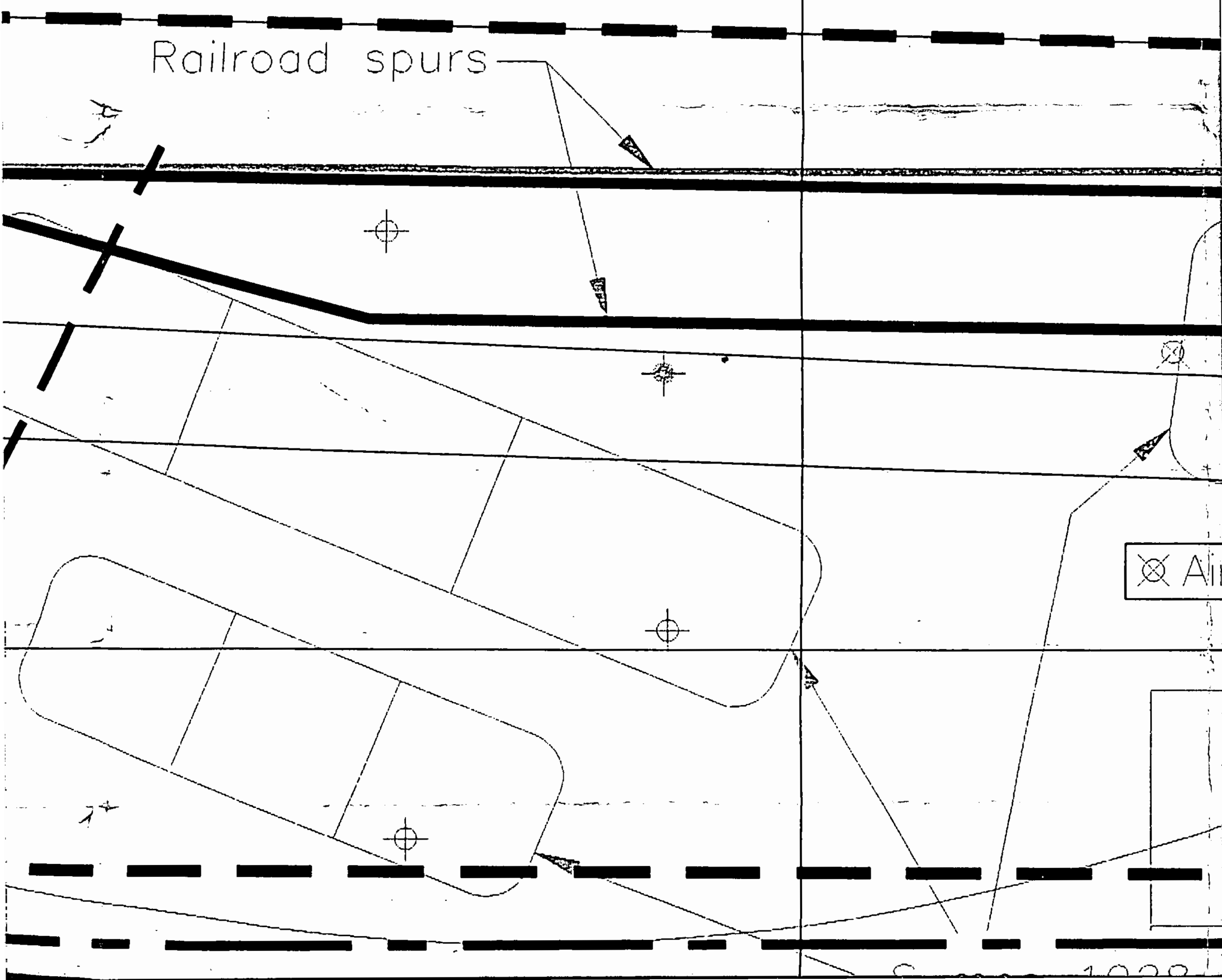



RAILROAD SECTIO
928-1974
Loading rack
(POWERINE OIL)
Electrical
panel
Stormwate
Inlet

06-'90	09-'90
91	64
7.4	2.2
8.6	3.4
(10.0)	(2.0)
(2.5)	1.7
(2.5)	0.6
(2.5)	22
(10.0)	(2.0)
(5.0)	(1.0)

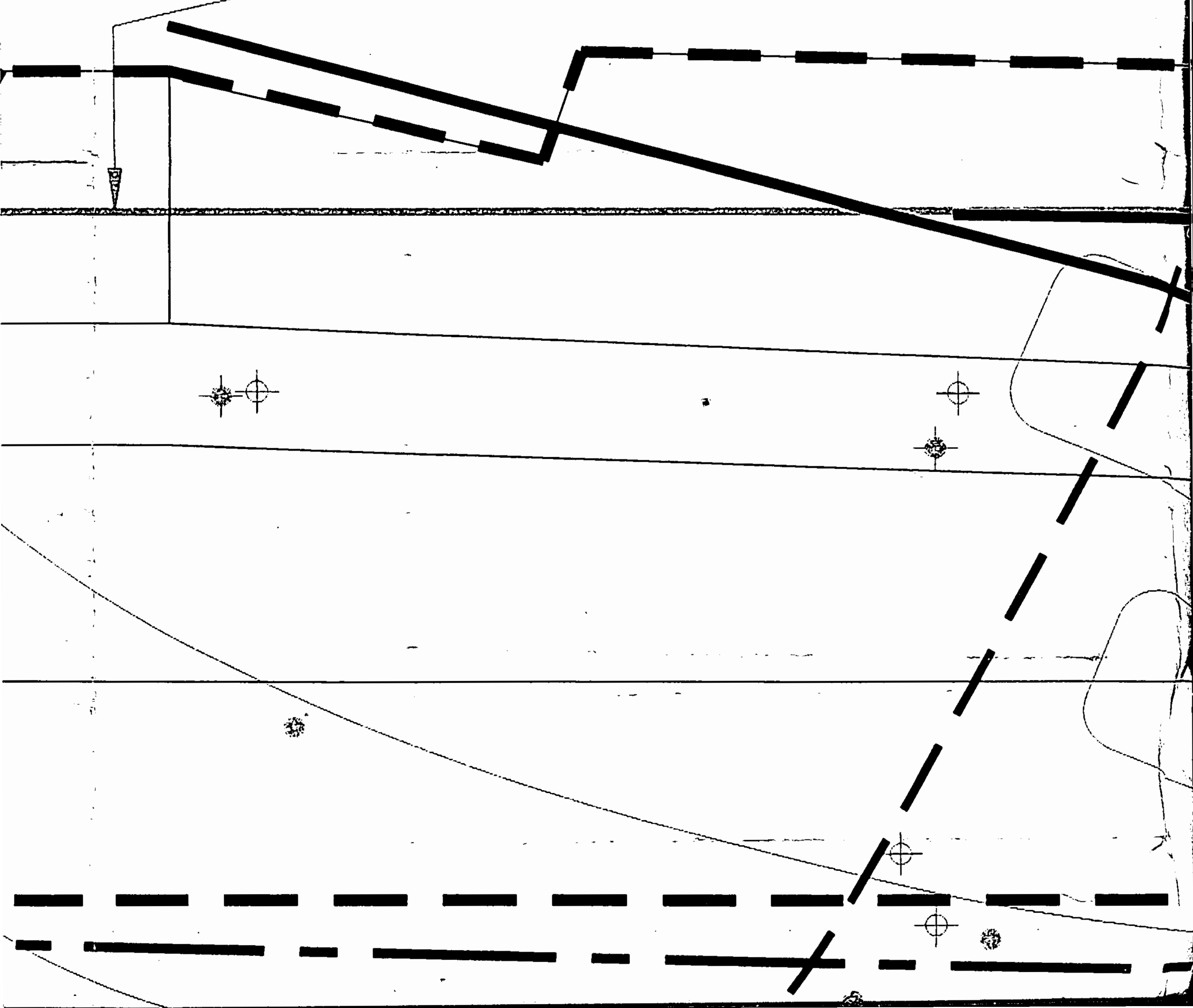


DATE / ANALYTE	11/89	03/90	04/90$_1$	04/90$_2$	04/90$_3$	04/90$_4$	06/90	09/90
BENZENE	78	62	77	83	79	79	91	64
TOLUENE	6.5	(0.5)	22	26	16	16	7.4	2.2
ETHYLBENZENE	6.5	(0.5)	4.0	1.5	1.3	(1.0)	8.6	3.4
XYLENES	5.0	(2.0)	(10.0)	(1.0)	1.5	(1.0)	(10.0)	(2.0)
1,1-DCA	4.3	(0.5)	(2.5)	3.0	2.5	(1.0)	(2.5)	1.7
TRANS-1,2-DCE	(0.5)	(1.0)	(5.0)	(1.0)	(0.3)	(1.0)	(2.5)	0.6
CIS-1,2-DCE				5.0		13	(2.5)	22
VINYL CHLORIDE	75	(2.0)	(10.0)	(1.0)	(0.6)	(5.0)	(10.0)	(2.0)
VINYL ACETATE				2.7		(5.0)		
BROMODICLORO-METHANE	(0.5)	(1.0)	(5.0)	(1.0)	(0.3)	(1.0)	(5.0)	(1.0)

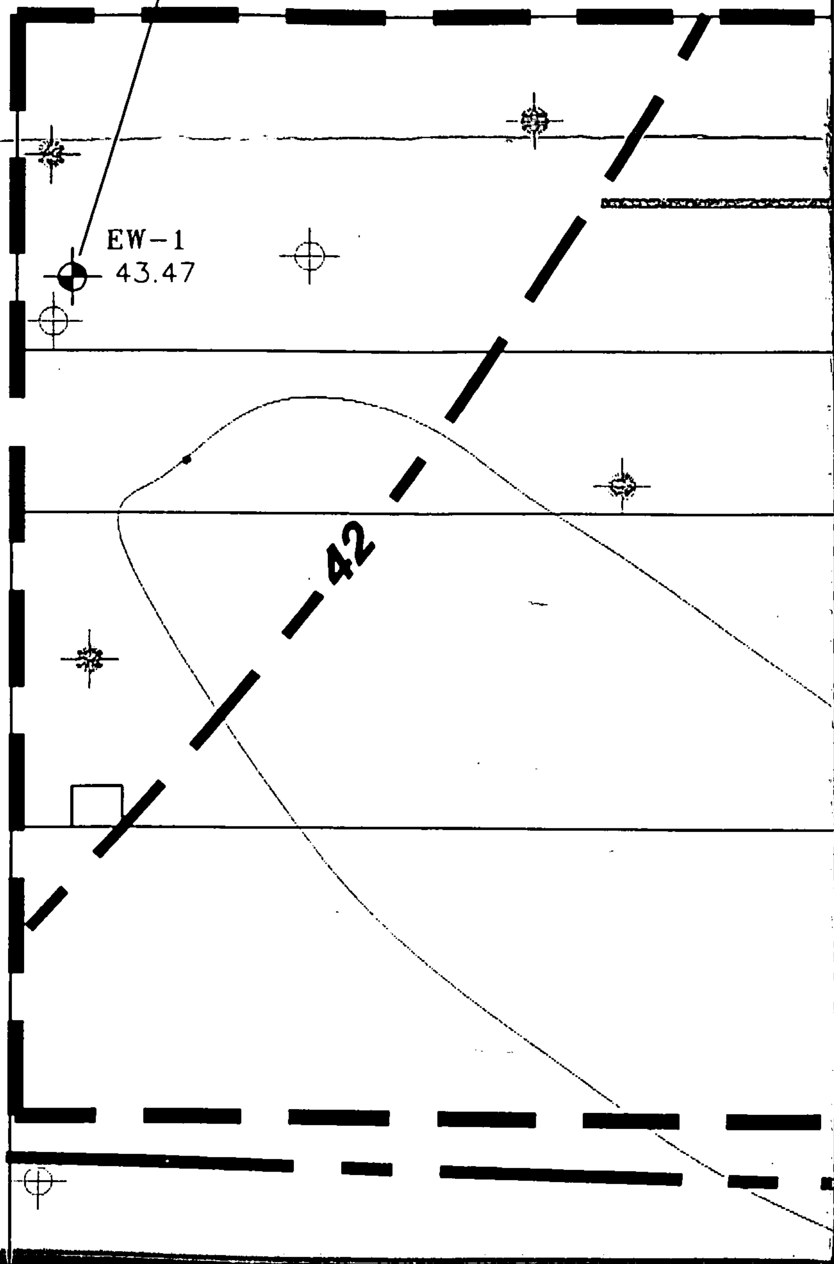


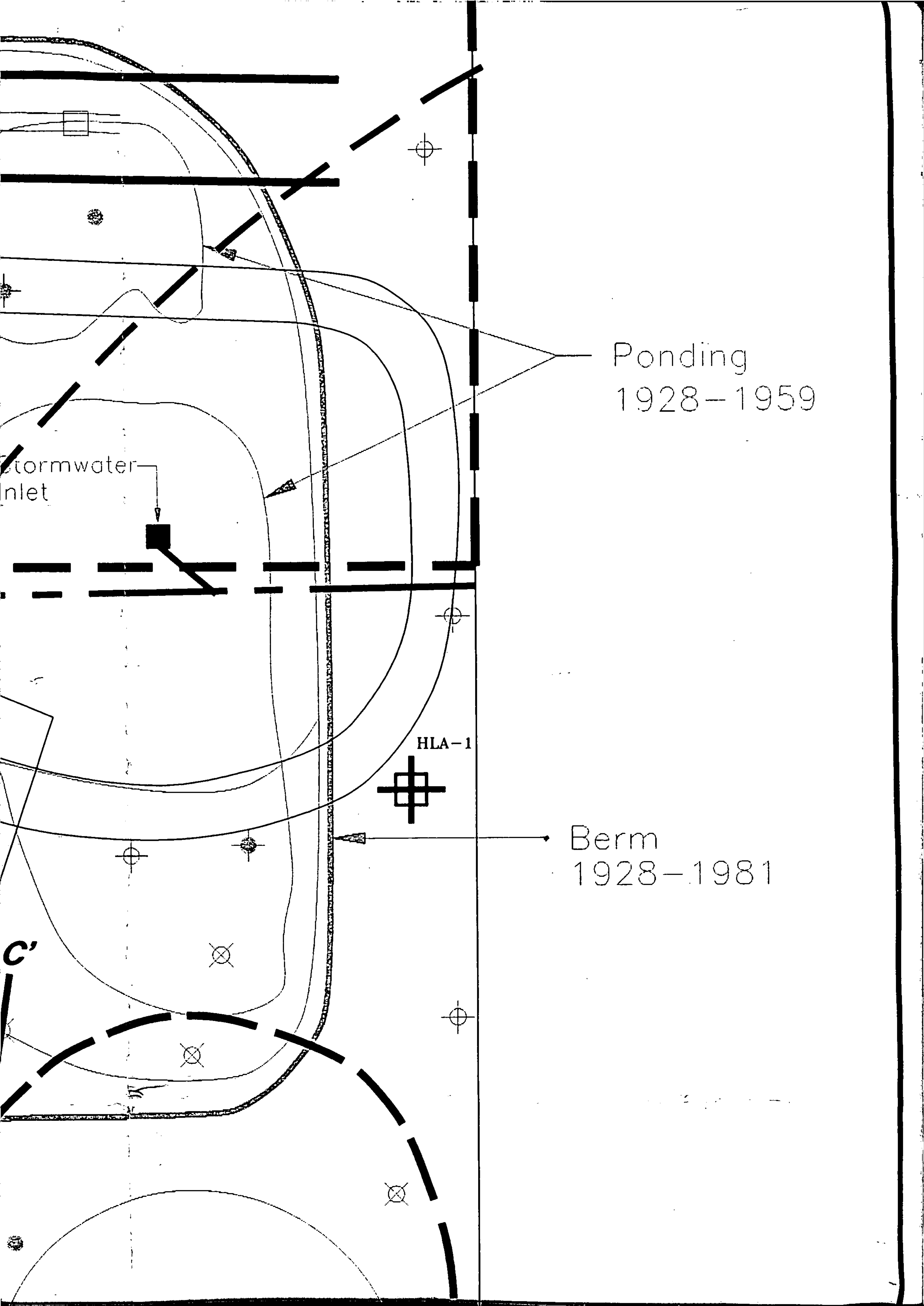
04/90	06/90	09/90
650	520	820
130	81	120
1,400	91	1,100
720	470	(100)
(10.0)	(25.0)	(25.0)
20	(25.0)	44
11	(25.0)	(25.0)
(50.0)	(100)	(100)
(50.0)		
(10.0)	(50.0)	(50.0)

Berm 1945–1957

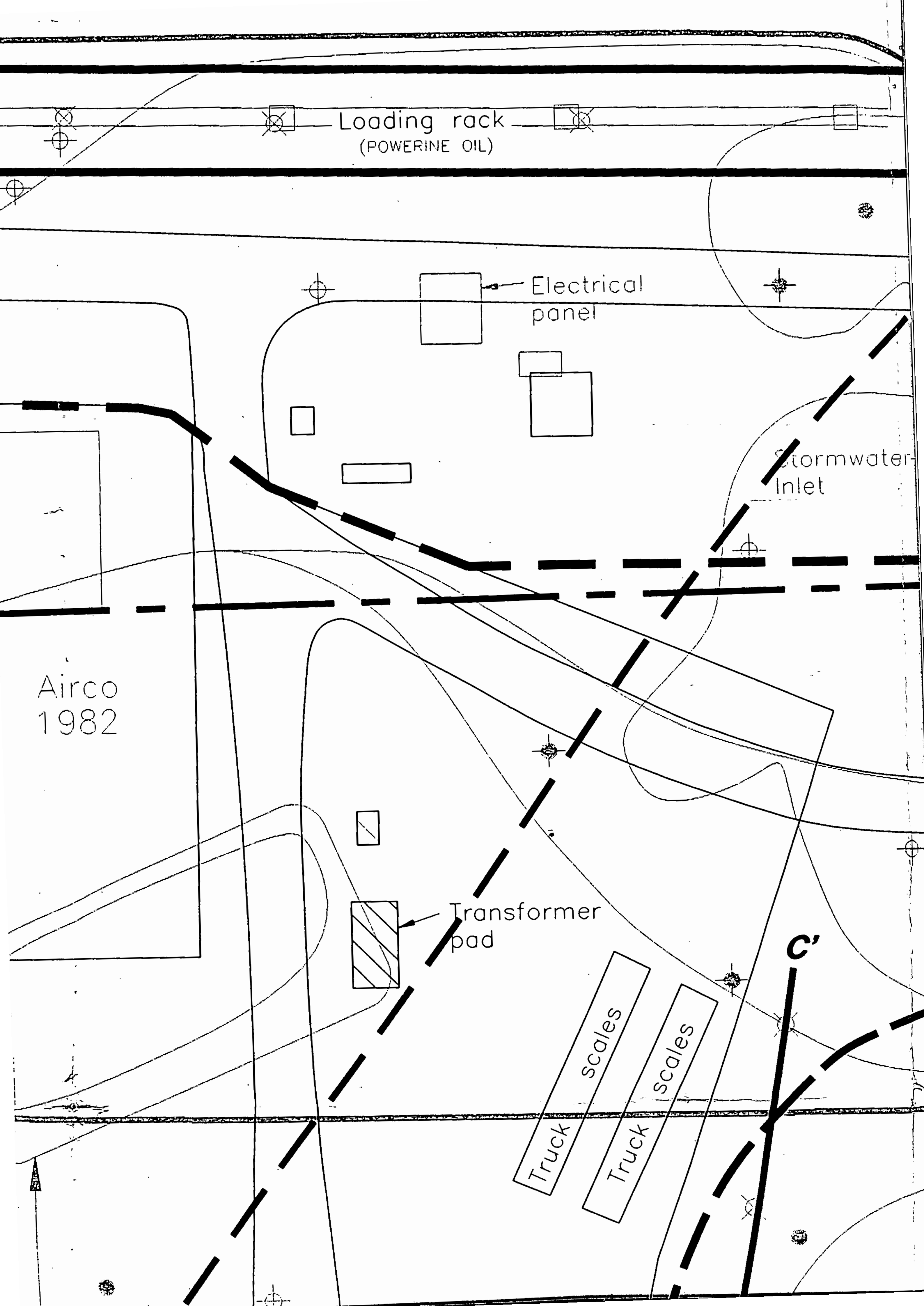


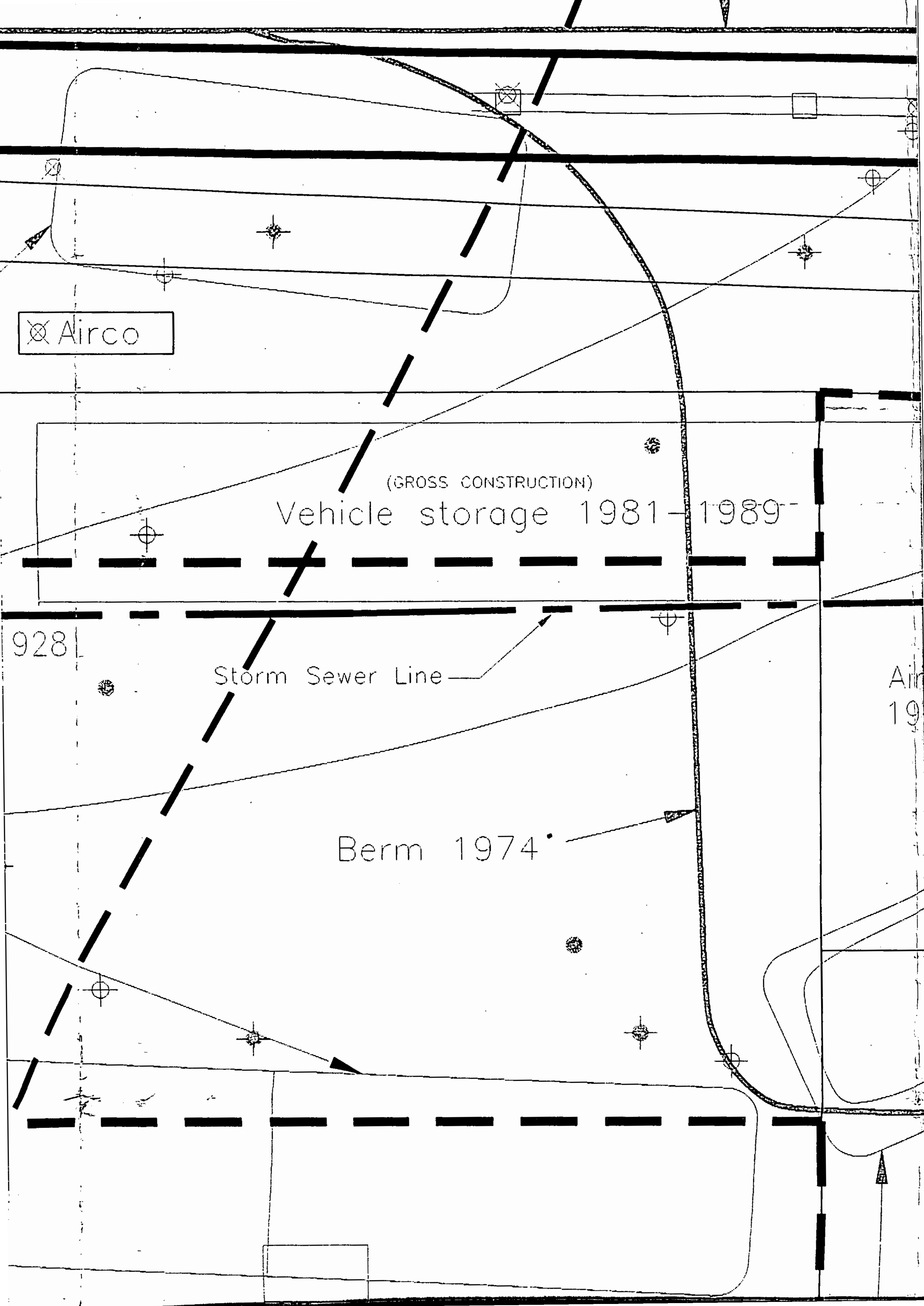
DATE / ANALYTE	11/89	03/90	04/90₁	04/90₂	04/90₃	04/90₄
BENZENE	730	1,800	1,300	640	460	650
TOLUENE	16	300	290	140	65	130
ETHYLBENZENE	1,400	1,800	1,600	820	1,000	1,400
XYLENES	1,000	620	580	2,000	510	720
1,1-DCA	(5.0)	(25.0)	(25.0)	(20.0)	(4.0)	(10.0)
TRANS-1,2-DCE	9.8	(50.0)	(50.0)	(20.0)	4.0	20
CIS-1,2-DCE				(100)		11
VINYL CHLORIDE	29	(100)	(100)	(20.0)	(6.0)	(50.0)
VINYL ACETATE				(40.0)		(50.0)
BROMODICLORO-METHANE	(5.0)	(50.0)	(50.0)	(20.0)	(3.0)	(10.0)



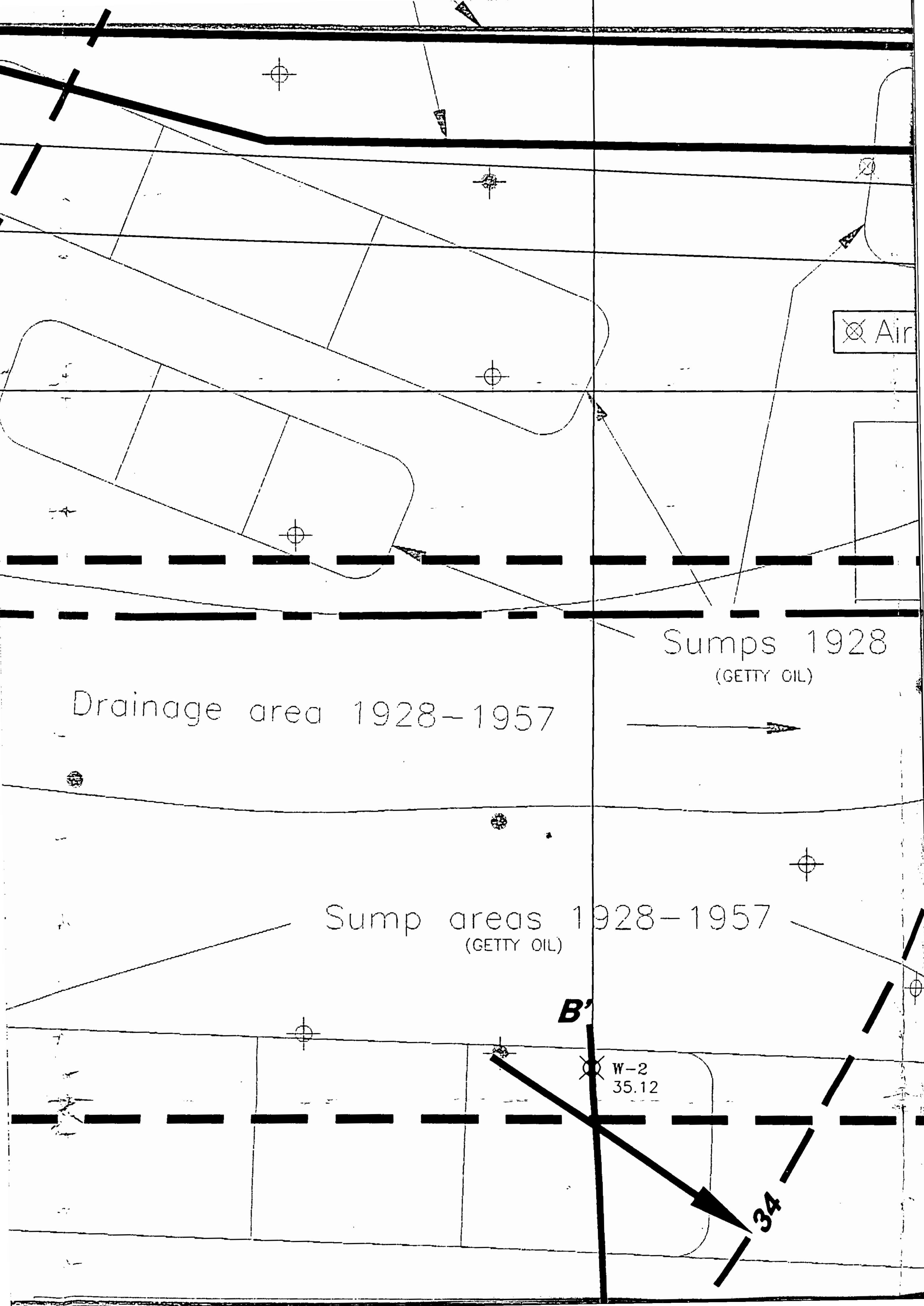


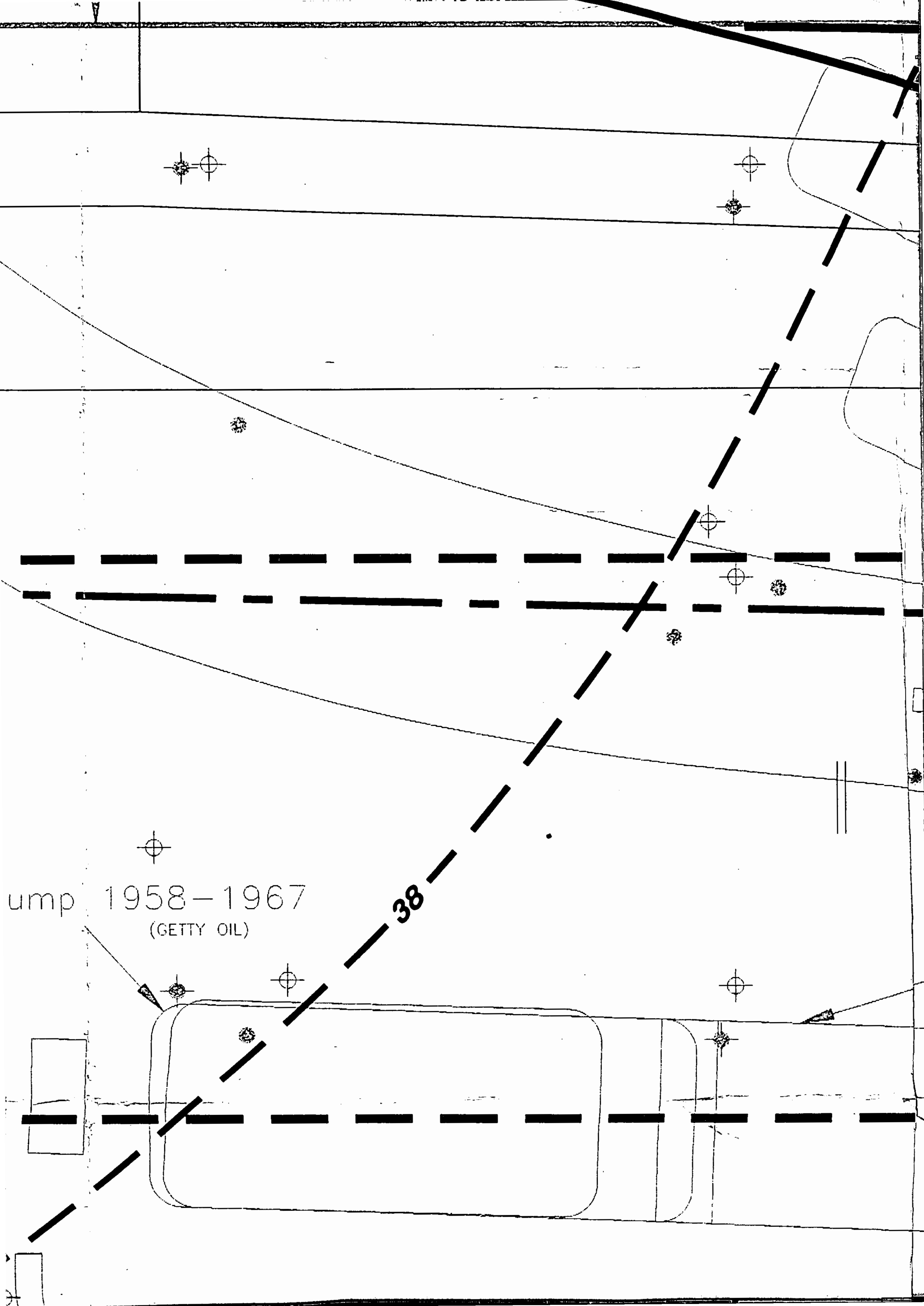
Ponding
1928–1959
Stormwater
Inlet
HLA–1
Berm
1928–1981
C'

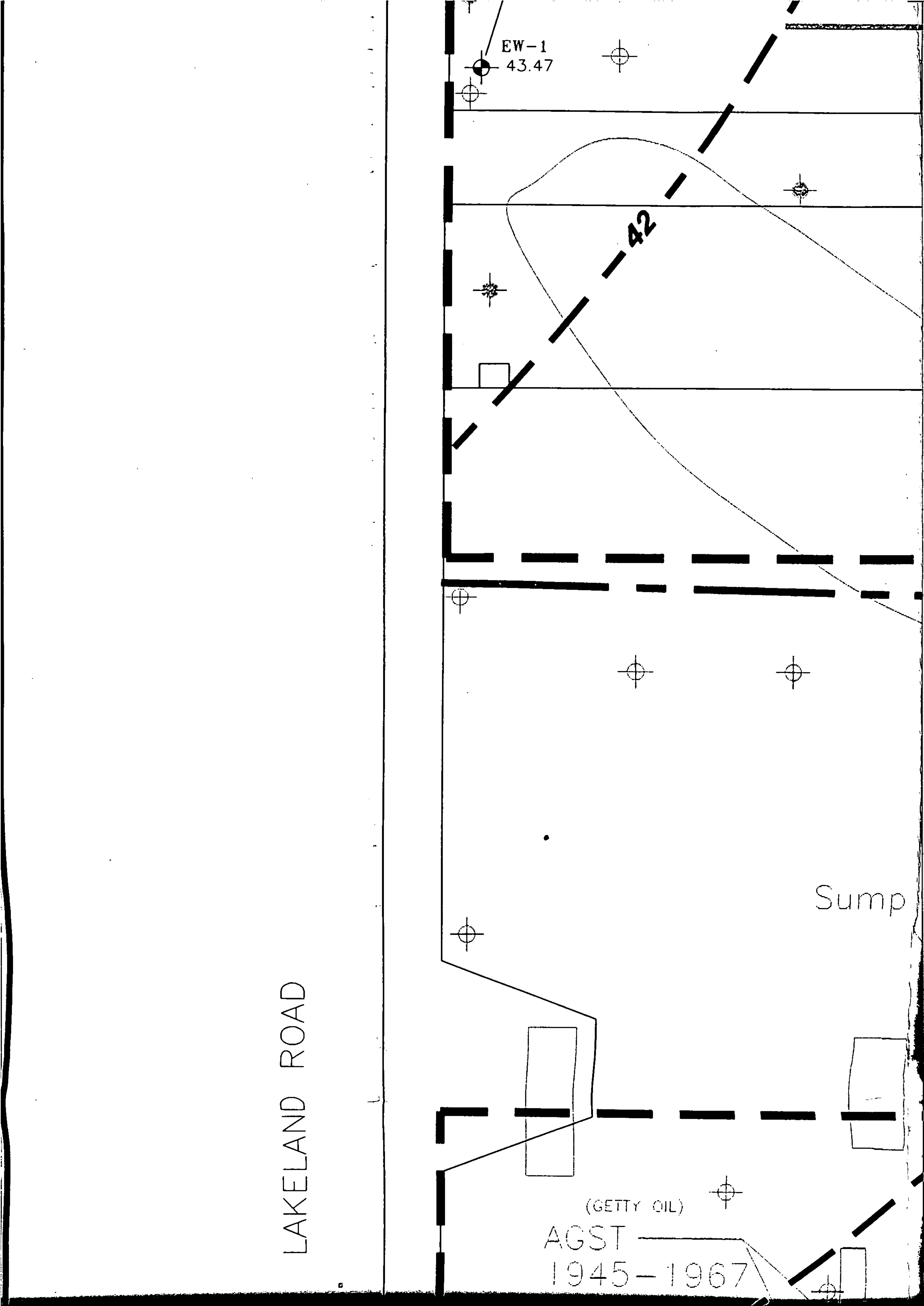

Loading rack
(POWERINE OIL)
Electrical panel
Stormwater Inlet
Airco 1982
Transformer pad
C'
Truck scales
Truck scales

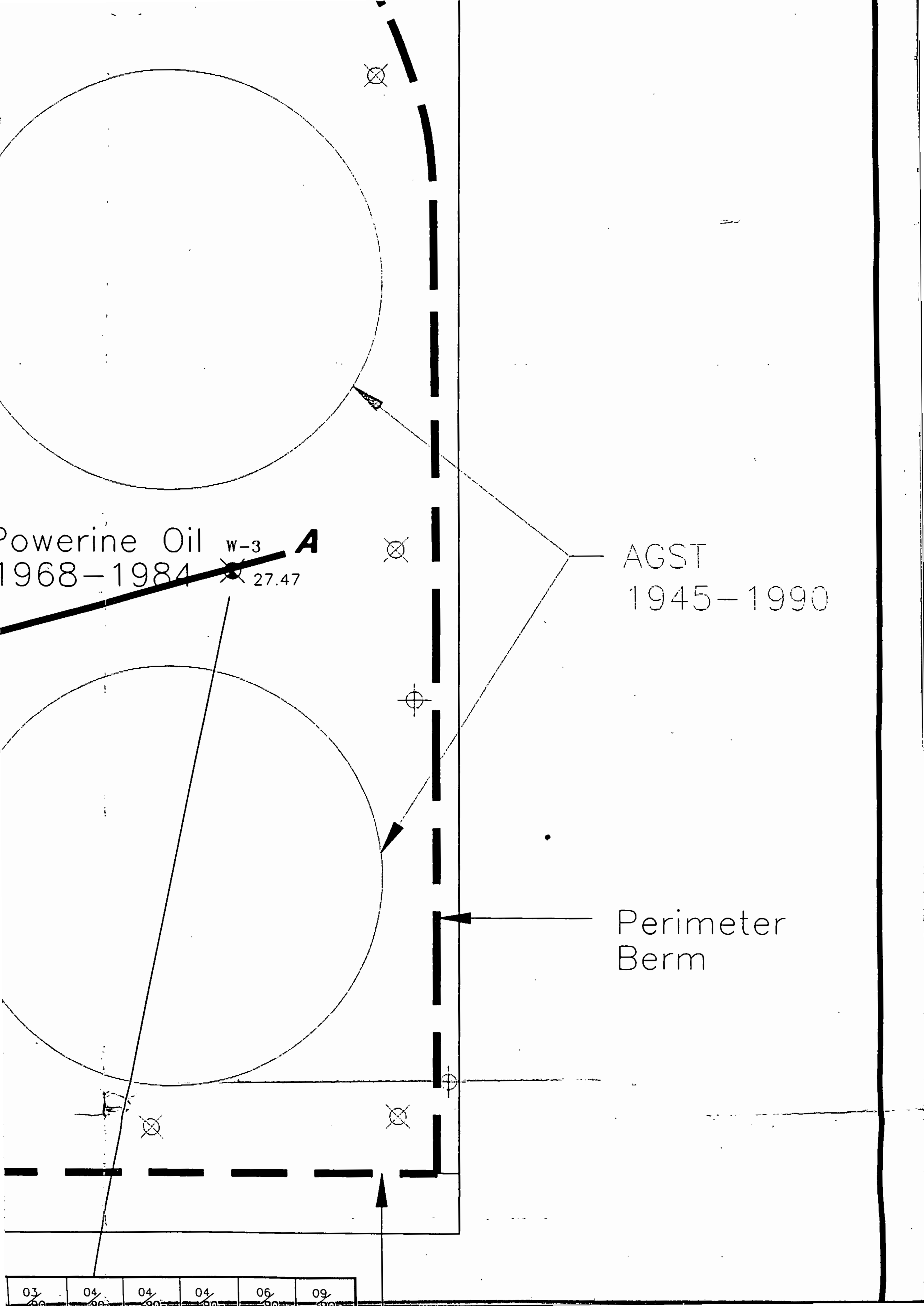


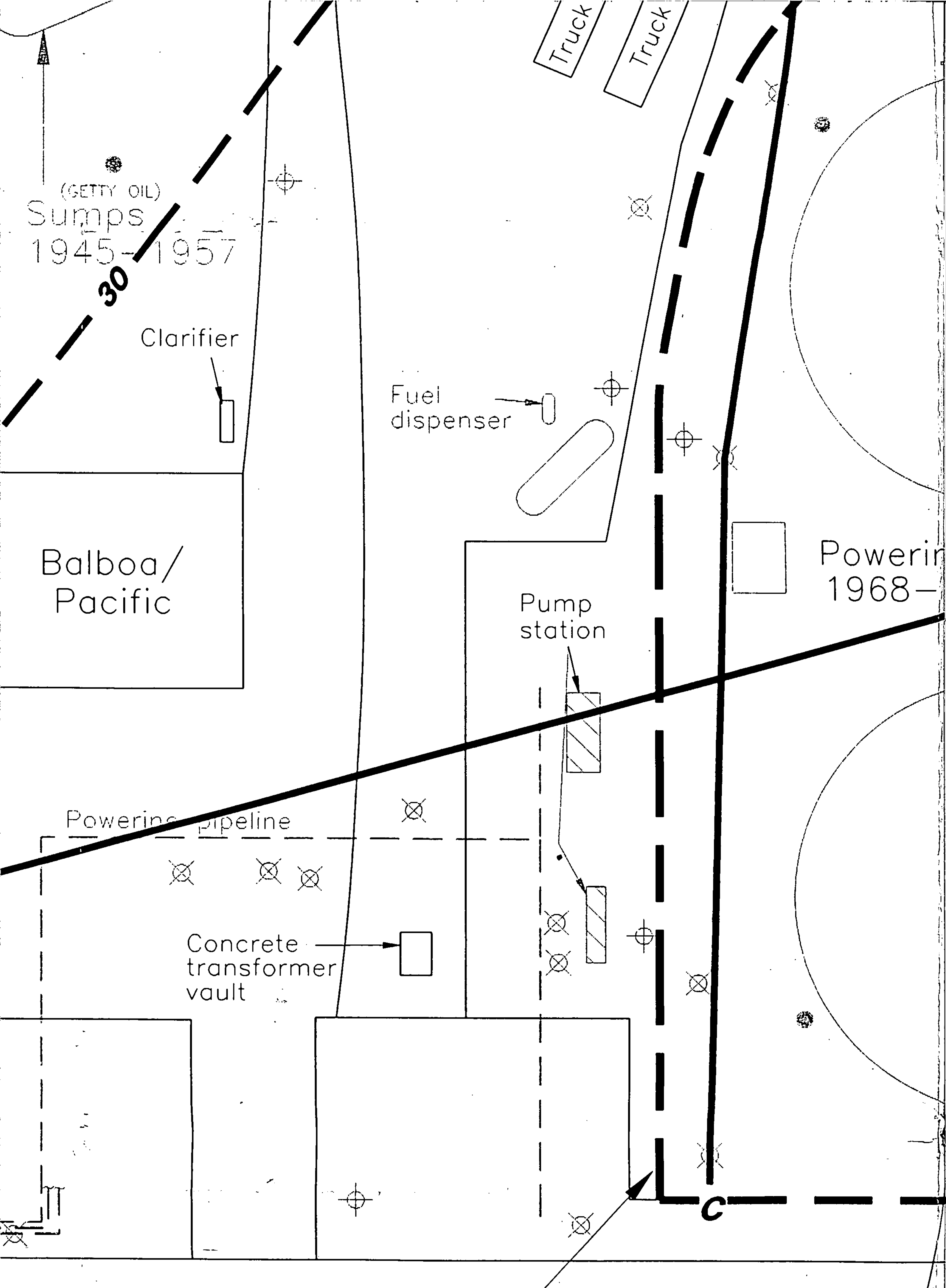
Airco
(GROSS CONSTRUCTION)
Vehicle storage 1981-1989
928
Storm Sewer Line
Berm 1974


Air
Sumps 1928
(GETTY OIL)
Drainage area 1928-1957
Sump areas 1928-1957
(GETTY OIL)
B'
W-2
35.12
34


ump 1958–1967
(GETTY OIL)
38

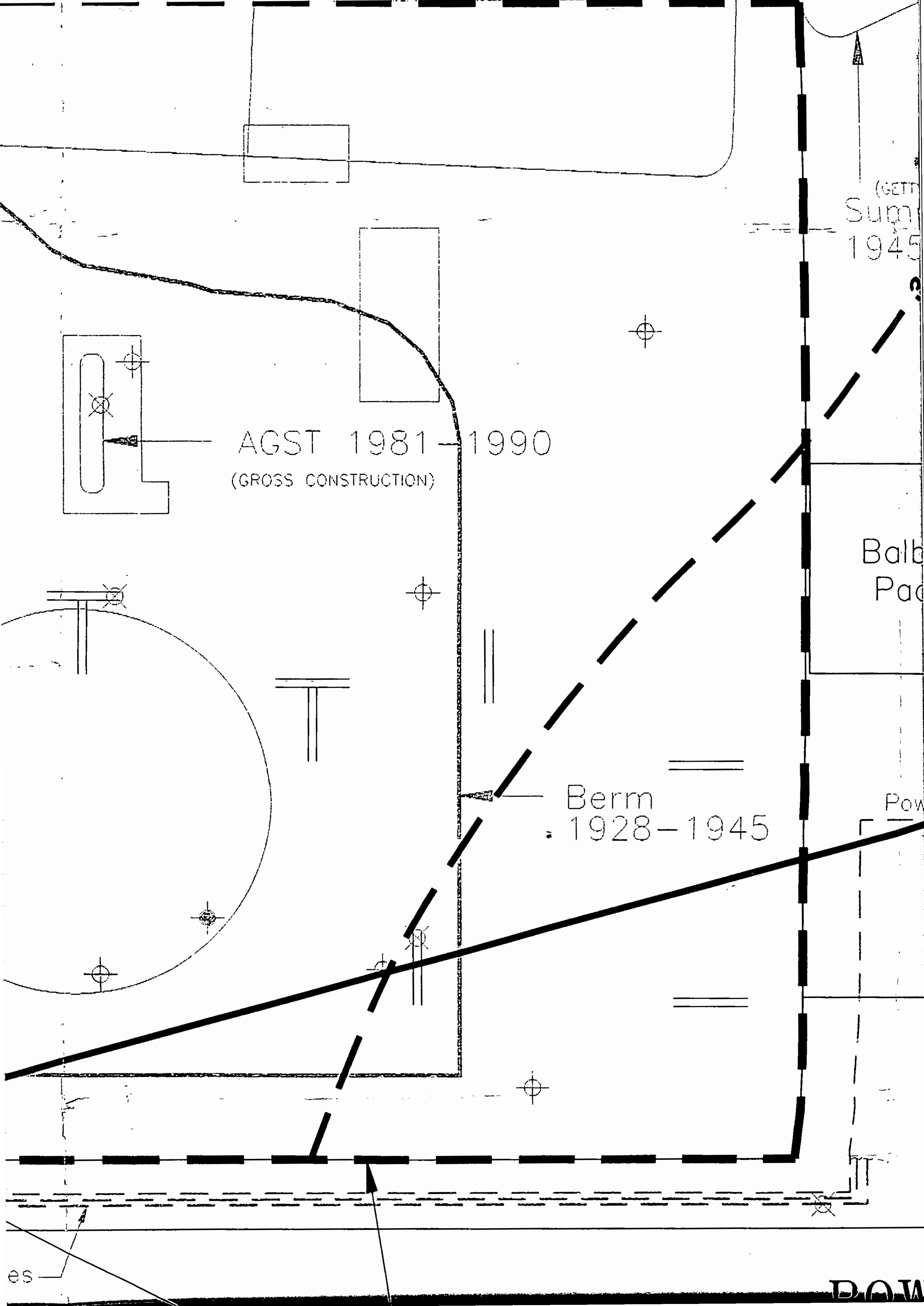

EW-1
43.47
42
Sump
LAKELAND ROAD
(GETTY OIL)
AGST
1945-1967


Powerine Oil
1968–1984
W-3
A
27.47
AGST
1945–1990
Perimeter
Berm
03
04
04
04
06
09

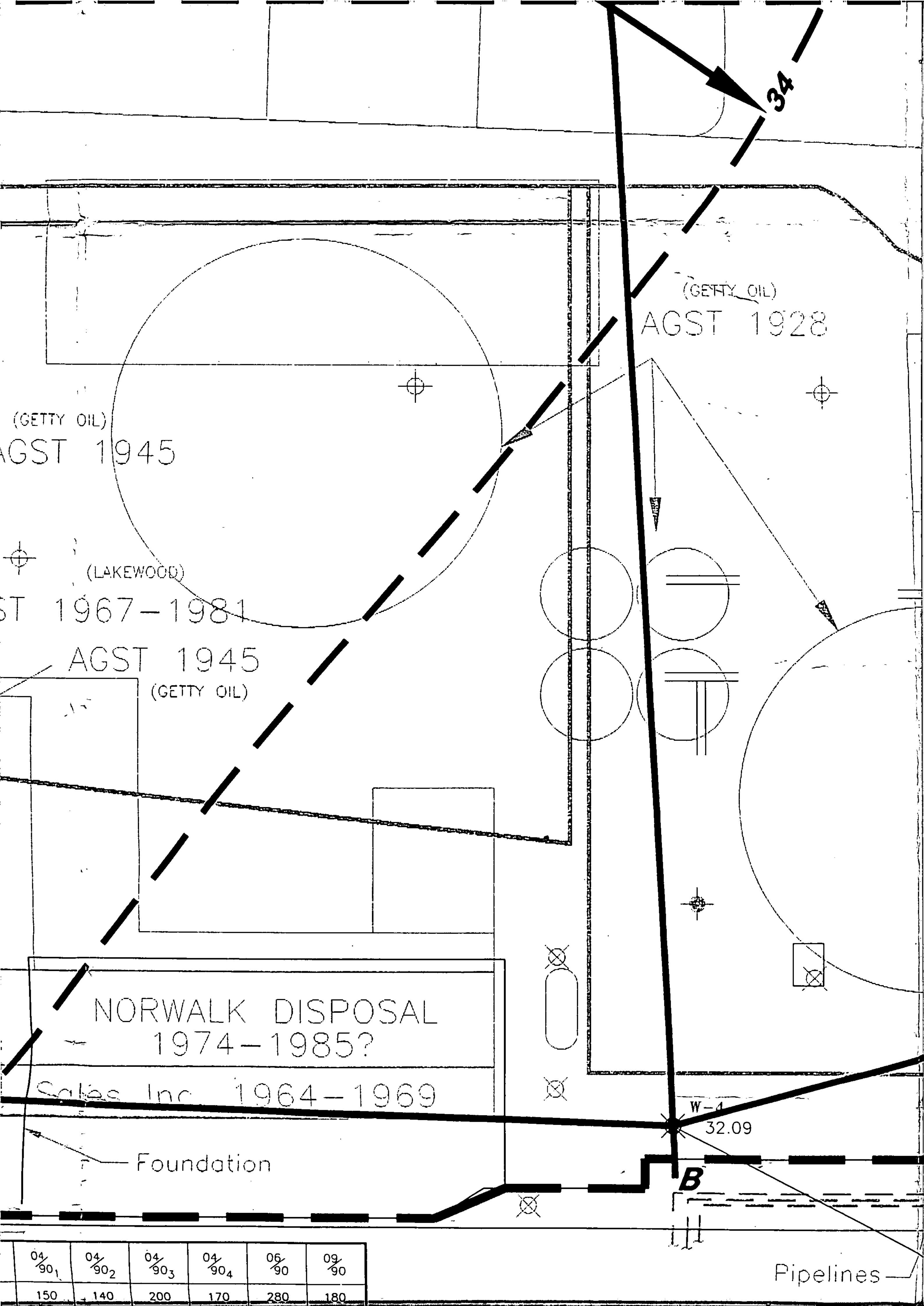


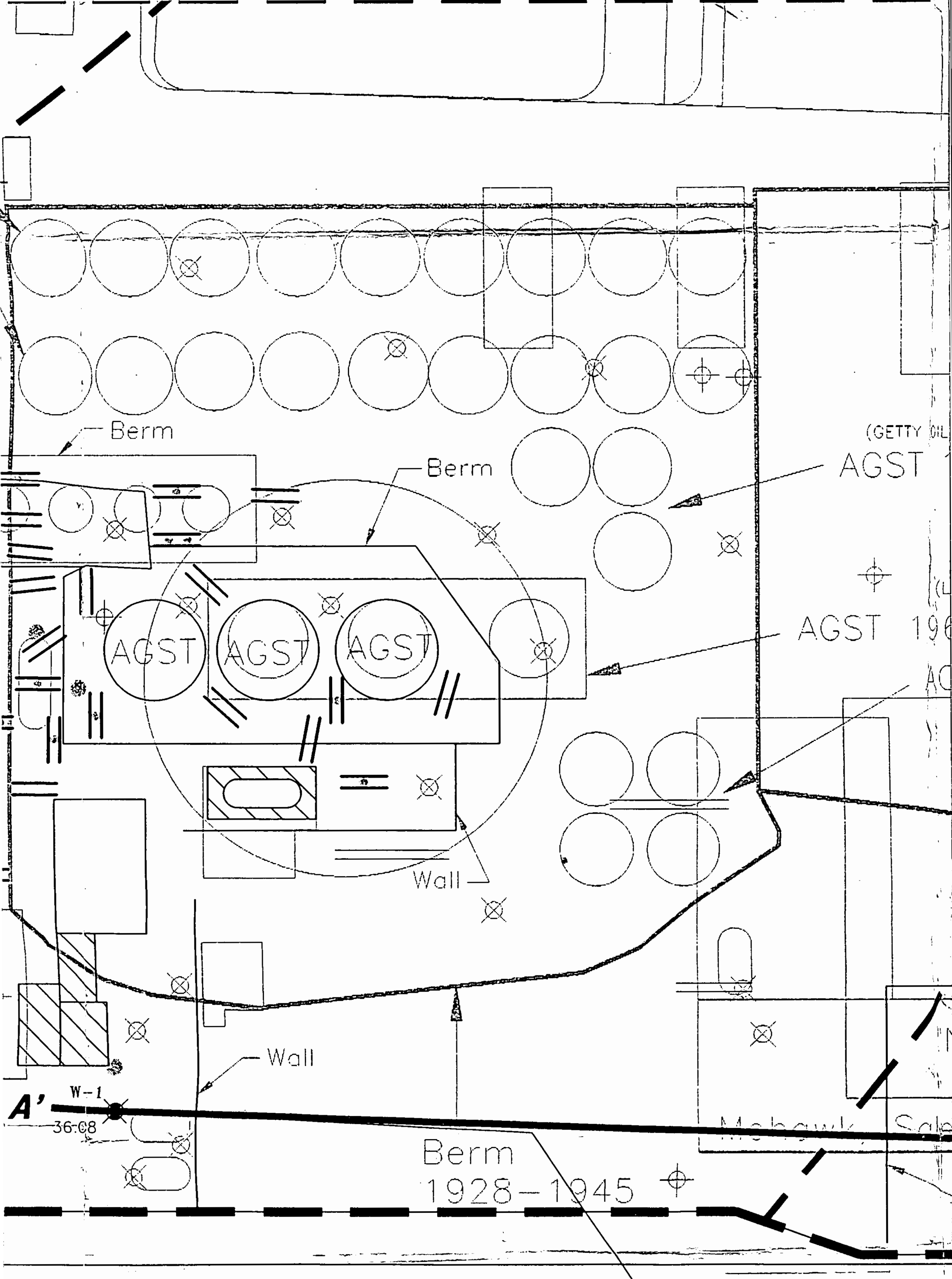
POWERINE AREA

DATE	11	01	03	04

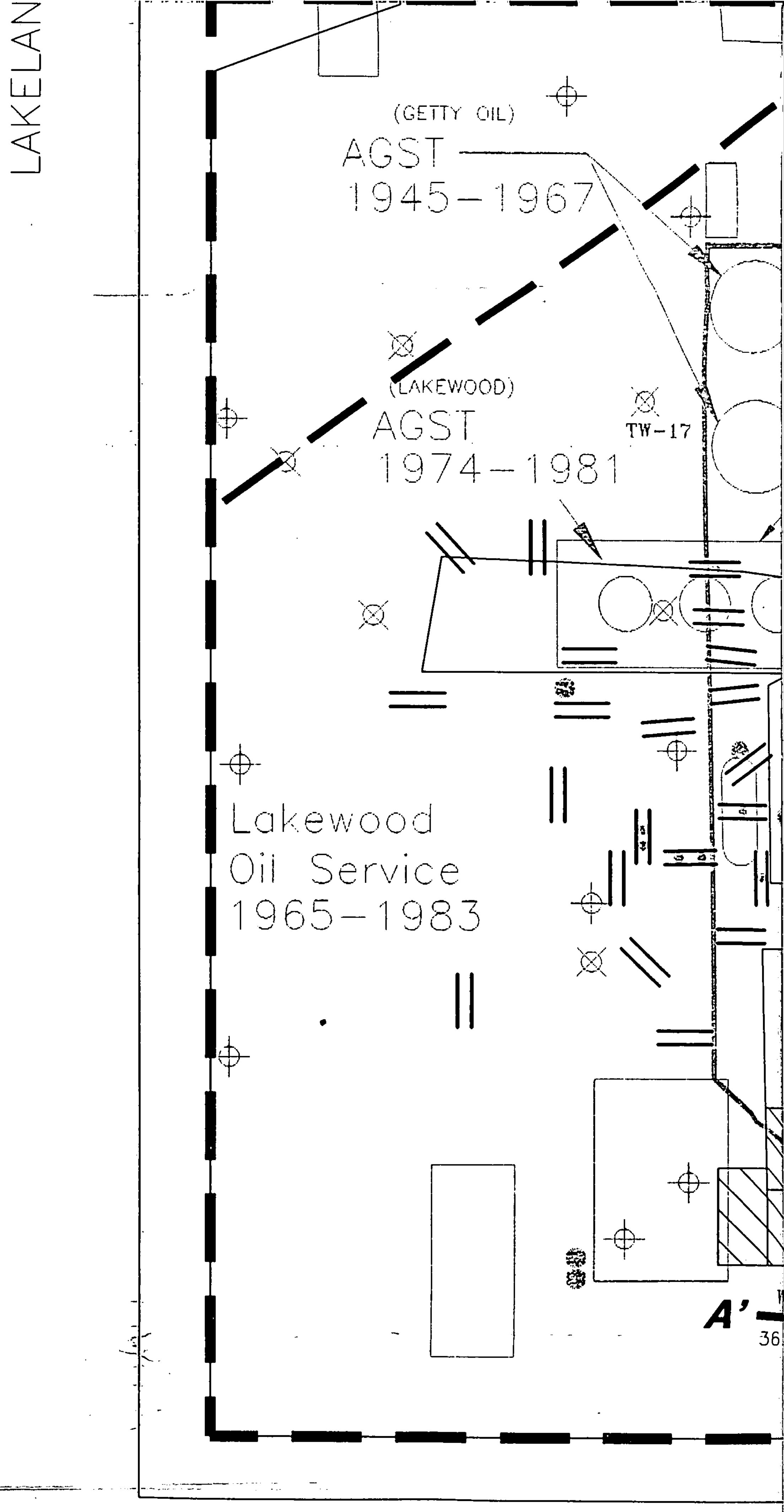


AGST 1981-1990
(GROSS CONSTRUCTION)
Berm
1928-1945
(GETT
Sum
1945
Balb
Pa
Pow
es

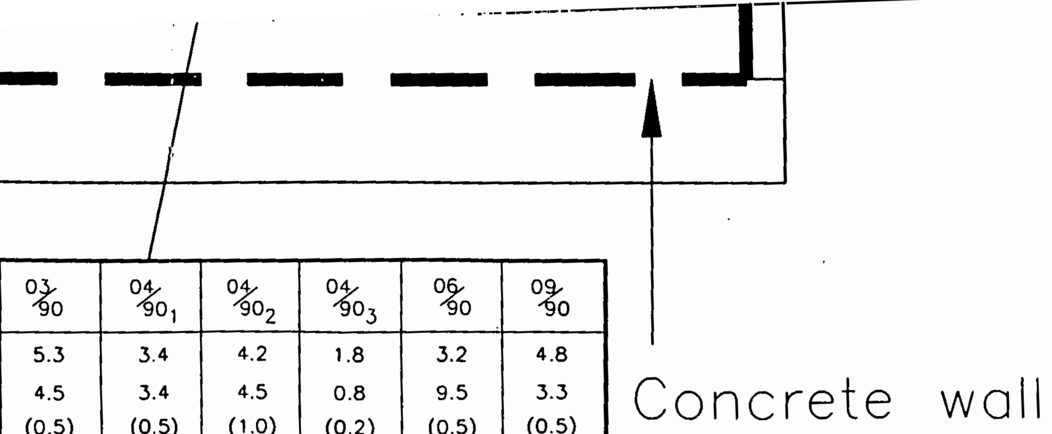

34
(GETTY OIL)
AGST 1928
(GETTY OIL)
GST 1945
(LAKEWOOD)
ST 1967-1981
AGST 1945
(GETTY OIL)
NORWALK DISPOSAL
1974-1985?
Sales Inc. 1964-1969
W-4
32.09
Foundation
B
Pipelines
04/90 1
04/90 2
04/90 3
04/90 4
06/90
09/90
150
140
200
170
280
180



DATE / ANALYTE	11/89	03/90	04/90
BENZENE	390	140	150



EXPLANANTION



03/90	04/90 1	04/90 2	04/90 3	06/90	09/90
5.3	3.4	4.2	1.8	3.2	4.8
4.5	3.4	4.5	0.8	9.5	3.3
(0.5)	(0.5)	(1.0)	(0.2)	(0.5)	(0.5)
(2.0)	(2.0)	(1.0)	(0.2)	9.5	3.3
0.5	(0.5)	(1.0)	(0.4)	(0.5)	0.9
(1.0)	(1.0)	(1.0)	(0.3)	(0.5)	(0.5)
		(5.0)		(0.5)	(0.5)
(2.0)	(2.0)	(1.0)	(0.6)	(2.0)	(2.0)
(1.0)	(1.0)	(1.0)	(0.3)	(1.0)	(1.0)

Harding Lawson Associates
Engineering and Environmental Services
3 Hutton Centre Drive
Suite 300
Santa Ana, CA 92707

HLA PROJECT NUMBER 22263-2	CLIENT NAME TEXACO, INC.
DRAWN BY: LJH/JTL DATE 4/93	DRAWING TITLE **EXISTING GROUNDWATER DATA** Walker Property Site Santa Fe Springs, California
CHECKED BY: DWC DATE 4/93	PLATE **7e**
APPROVED BY: HLA: DWC DATE 4/93 CLIENT:	SCALE 1" = 100'

POWERINE AREA

CTION

DATE / ANALYTE	11/89	01/90	03/90	04/90
BENZENE	19	(0.5)	5.3	3.4
TOLUENE	2.6	(0.5)	4.5	3.4
ETHYLBENZENE	7.6	(0.5)	(0.5)	(0.5)
XYLENES	13	3.3	(2.0)	(2.0)
1,1-DCA	2.5	1.0	0.5	(0.5)
TRANS-1,2-DCE	(0.5)	(1.0)	(1.0)	(1.0)
CIS-1,2-DCE				
VINYL CHLORIDE	7.1	(2.0)	(2.0)	(2.0)
VINYL ACETATE				
BROMODICLORO-METHANE	(0.5)	(1.0)	(1.0)	(1.0)

N

Scale 0 35 70 140 feet

Approximate scale

nes

D AVENUE

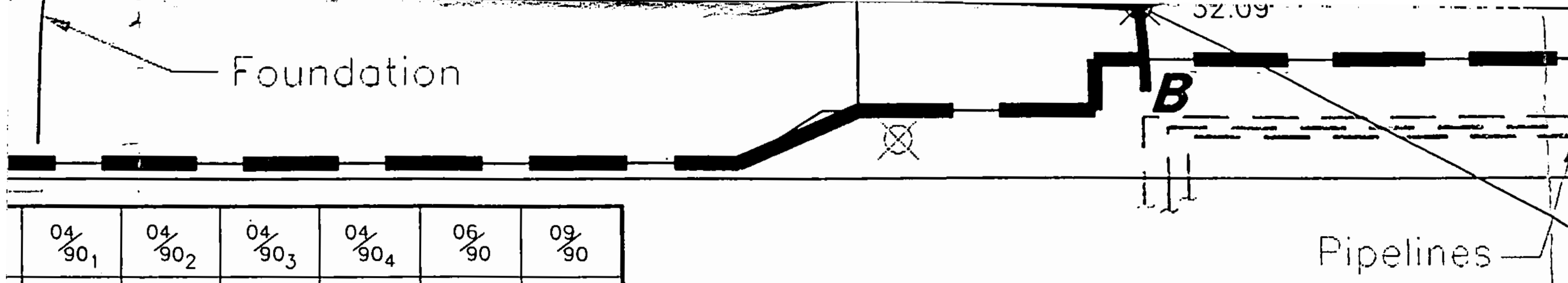
PO

LAKEWOOD SECTI

02	04/90$_1$	04/90$_2$	04/90$_3$	04/90$_4$	04/90$_5$	06/90	09/90
	28	31	16	(1.0)	(0.5)	21	19
)	1.4	1.0	1.2	(1.0)	(0.5)	(0.5)	(0.5)
)	4.8	1.6	0.9	(1.0)	(0.5)	2.2	1.5
)	(2.0)	(1.0)	2.2	(1.0)	(0.5)	3.0	2.5
	1.7	2.2	1.4	(1.0)	1.0	1.0	3.1
)	(1.0)	(1.0)	(0.3)	(1.0)	(0.5)	(0.5)	(0.5)
2		(5.0)		(1.0)	0.81	(0.5)	(0.5)
5)	4.2	4.3	(0.6)	(5.0)	(0.5)	(2.0)	(2.0)
		(2.0)		(5.0)			
.5)	(1.0)	(1.0)	(0.3)	(1.0)	(0.5)	(1.0)	(1.0)

NOTES

11/89 – Analysis by EPA Method 601/602 (Del Mar Analytical)
01/90 – Analysis by EPA Method 601/602 (Del Mar Analytical)
03/90 – Analysis by EPA Method 601/602 (Del Mar Analytical)
04/90$_1$ – Analysis by EPA Method 601/602 (Del Mar Analytical)
04/90$_2$ – Analysis by EPA Method 624 (Del Mar Analytical)
04/90$_3$ – Analysis by EPA Method 601/602 (West Coast Analytical)
04/90$_4$ – Analysis by EPA Method 624 (West Coast Analytical)
04/90$_5$ – Analysis by EPA Method 624 (RWQCB)
06/90 – Analysis by EPA Method 601/602 (Del Mar Analytical)
09/90 – Analysis by EPA Method 601/602 (Del Mar Analytical)



$04/90_1$	$04/90_2$	$04/90_3$	$04/90_4$	06/90	09/90
150	140	200	170	280	180
10	12	4.9	(2.0)	(2.5)	3.0
12	9.0	11	7.0	21	7.8
(20.0)	(5.0)	2.7	(2.0)	(10.0)	2.6
(5.0)	(5.0)	1.6	(2.0)	(2.5)	1.8
(10.0)	(5.0)	(0.3)	(2.0)	(2.5)	(0.5)
	(25.0)		(2.0)	(2.5)	20
(20.0)	(5.0)	(0.6)	(10.0)	(10.0)	(2.0)
	(10.0)		(10.0)		
(10.0)	(5.0)	(0.3)	(2.0)	(5.0)	(1.0)

BLOOMFIELD AV

DATE / ANALYTE	$03/90_1$	$03/90_2$	$04/90_1$
BENZENE	120	16	28
TOLUENE	(5.0)	(0.5)	1.4
ETHYLBENZENE	19	(0.5)	4.8
XYLENES	(20.0)	(0.5)	(2.0)
1,1-DCA	8.3	1.5	1.7
TRANS-1,2-DCE	(10.0)	(0.5)	(1.0)
CIS-1,2-DCE		3.2	
VINYL CHLORIDE	(20.0)	(0.5)	4.2
VINYL ACETATE			
BROMODICLORO-METHANE	(10.0)	(0.5)	(1.0)

wash-down sump

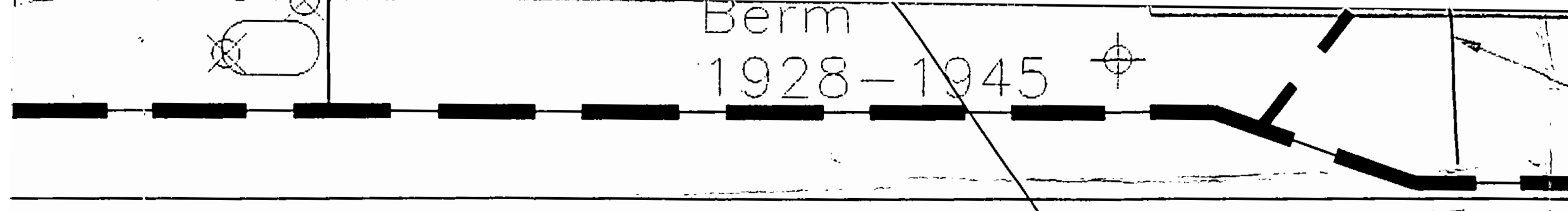
te pad

line indicates existing features

ne; indicates previous features

of cross section (Plates 9 through 9c)

sed groundwater monitoring well



DATE / ANALYTE	11/89	03/90	04/90
BENZENE	390	140	150
TOLUENE	3.9	(5.0)	10
ETHYLBENZENE	2.1	(5.0)	12
XYLENES	6.4	(20.0)	(20.0)
1,1-DCA	3.5	(5.0)	(5.0)
TRANS-1,2-DCE	(0.5)	(10.0)	(10.0)
CIS-1,2-DCE			
VINYL CHLORIDE	21	(20.0)	(20.0)
VINYL ACETATE			
BROMODICLORO-METHANE	(0.5)	(10.0)	(10.0)

re soil boring

ng
r elevation, feet

ytical vapor well

er elevations
w direction
ches by Dames and Moore
location
ches by TRC
location
) groundwater elevations

Truck wash-

Concrete pa

Black line

Gray line in

Lines of cr

HLA-1 Proposed g

EXPLANANTION

Dames and Moore so

EW-1
43.47 EMCON soil boring
with groundwater ele

EMCON well

Geoscience Analytical

TRC soil boring

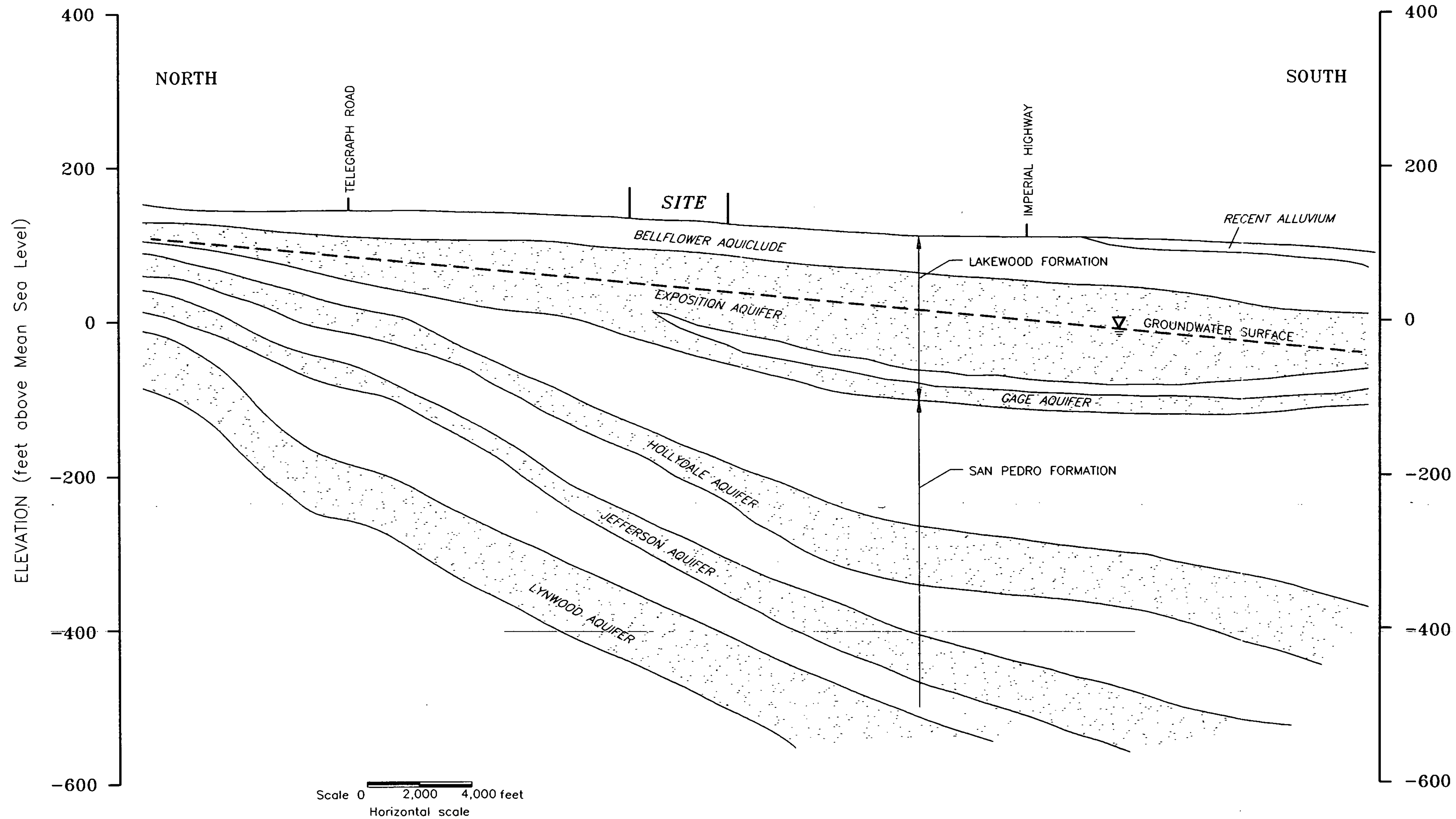
W-1
36.08 TRC well
with groundwater ele

Groundwater flow dir

32 shallow trenches
with sample locat

16 shallow trenches
with sample locat

30 — — September 1990 grou



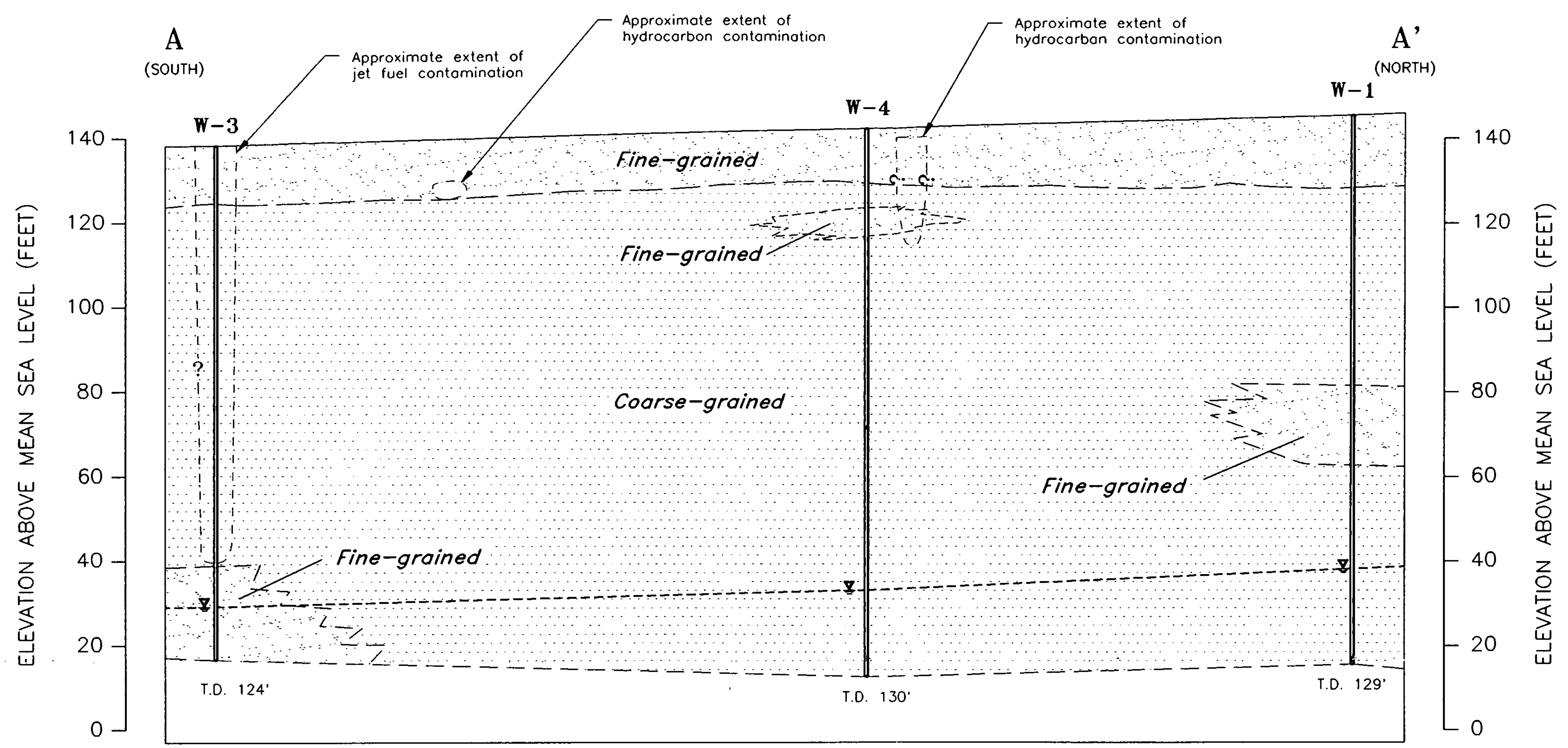
Source: D.W.R. Bulletin 104 (adopted from Section N-N').
Note: Section taken along Bloomfield Avenue.

Harding Lawson Associates
Engineering and Environmental Services

CROSS SECTION
Walker Property Site
Santa Fe Springs, California

PLATE 8

DRAWN	PROJECT-TASK NUMBER	APPROVED	DATE	REVISED	DATE
LJH	22263-2	DWG	4/93		



Note: Line of cross section shown on Plate 7d.

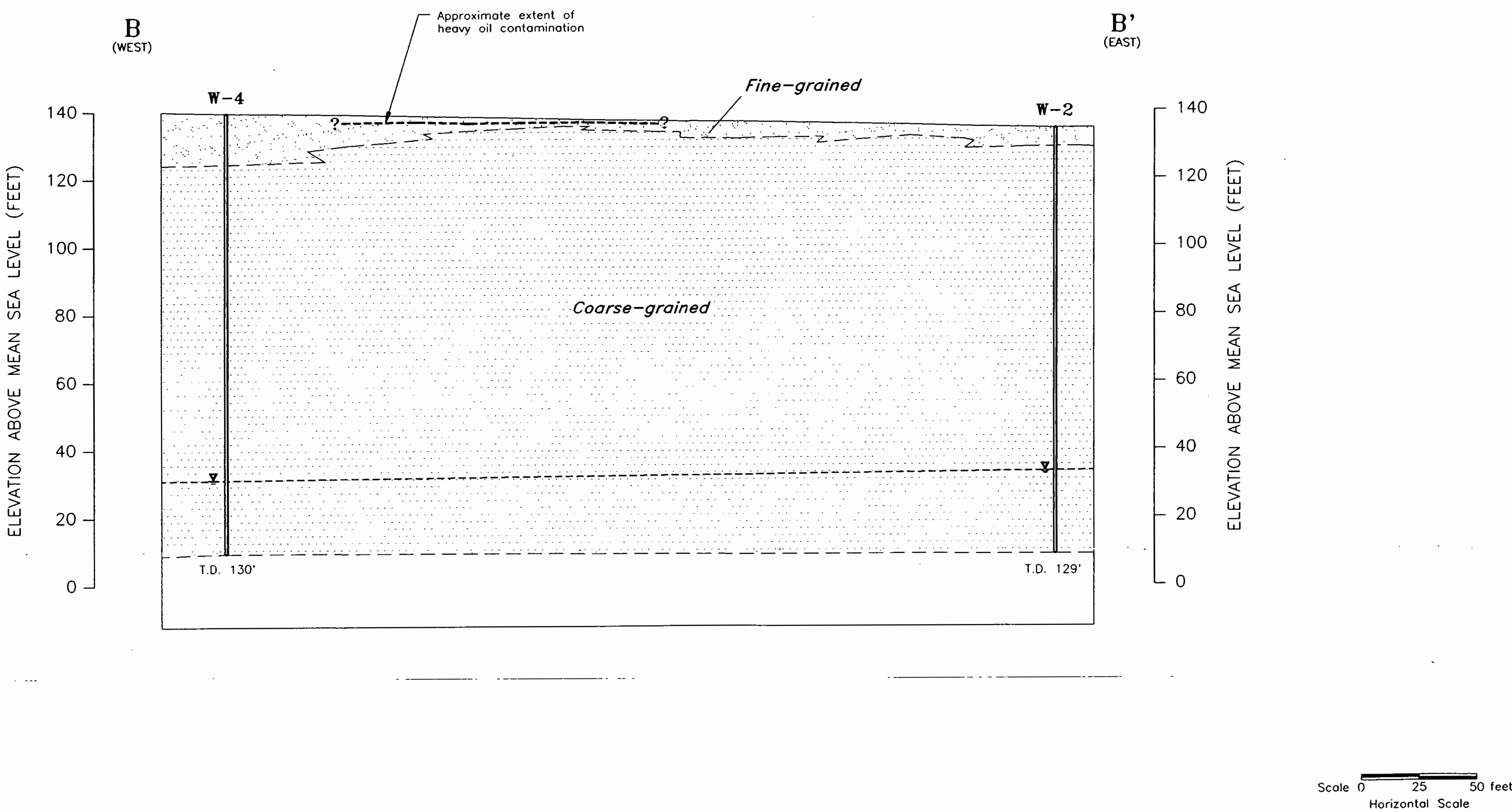
Reference: TRC, 1990j.

Harding Lawson Associates
Engineering and
Environmental Services

CROSS SECTION A-A'
Walker Property Site
Santa Fe Springs, California

PLATE
9a

DRAWN	PROJECT-TASK NUMBER	APPROVED	DATE	REVISED	DATE
LJH	22263-2	DWG	2/93		



Note: Line of cross section shown on Plate 7d.

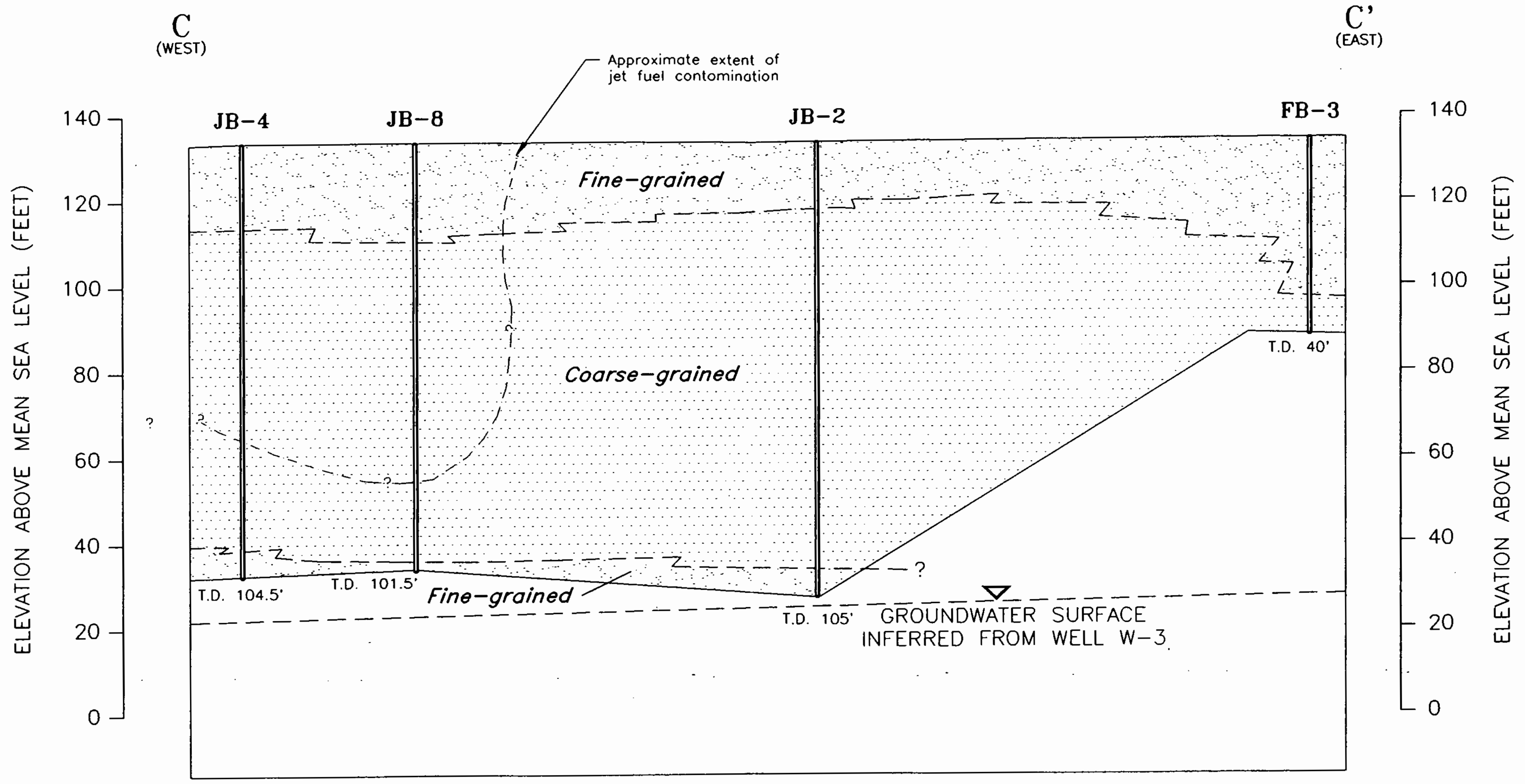
Reference: TRC, 1990j.

Harding Lawson Associates
Engineering and Environmental Services

CROSS SECTION B-B'
Walker Property Site
Santa Fe Springs, California

PLATE **9b**

DRAWN	PROJECT-TASK NUMBER	APPROVED	DATE	REVISED	DATE
LJH	22263-2	DWO	2/93		



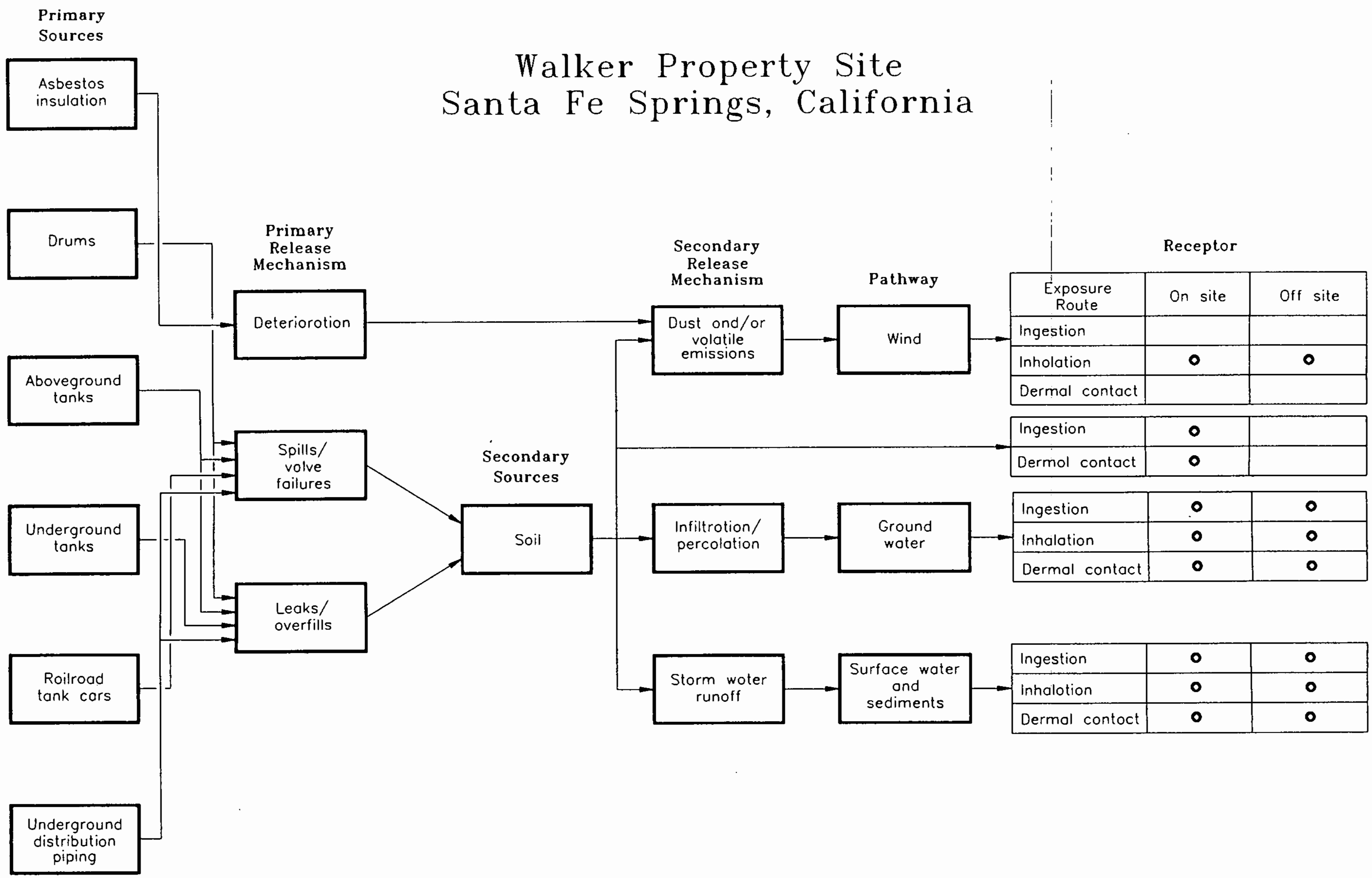
Note: Line of cross section shown on Plate 7d.
Reference: TRC, 1990j.

Harding Lawson Associates
Engineering and
Environmental Services

CROSS SECTION C–C'
Walker Property Site
Santa Fe Springs, California

PLATE 9c

DRAWN	PROJECT–TASK NUMBER	APPROVED	DATE	REVISED	DATE
LJH	22263–2	DWP	2/93		



Harding Lawson Associates
Engineers and Geoscientists

CONCEPTUAL MODEL
Walker Property Site
Santa Fe Springs, California

PLATE
10

DRAWN	PROJECT–TASK NUMBER	APPROVED	DATE	REVISED	DATE
LJH	22263-2	DWG	2/93		

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QUALITY CONTROL REVIEWER:

Ted A. Koelsch

Ted A. Koelsch, Ph.D.
Principal Hydrogeologist

GRA/DWQ/hk/lf